IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

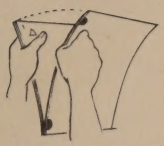
This PHOTOFACT Folder Set is

WIRE-SEALED FOR YOUR PROTECTION

to guarantee completeness of contents

DO NOT ACCEPT IF SEAL HAS BEEN BROKEN

TO OPEN ***JUST DO THIS:***



1

Take hold of the Set with both hands. Place your thumbs directly under the top wire-seal; then, divide the contents equally by putting your thumbs midway through the thickness of the Set. Now, pull the two sections apart at the top, firmly.

2

Repeat this process, pulling close to the wire-seal at the bottom, so that the set is now divided into two equal parts.

3

Continue this "pulling-apart" process with the section in which the wire-seals remain, dividing it in half.

4

Finally, remove the wire-seals left in the last section; this can easily be done with your fingernail or any sharp instrument.

Your "Safety-Sealed" PHOTOFACT Set is now ready for profit-making use . . .

IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

The PHOTOFACT® Servicer

SET 490 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ JUNE 1960

CONTENTS PHOTOFACT SET 490

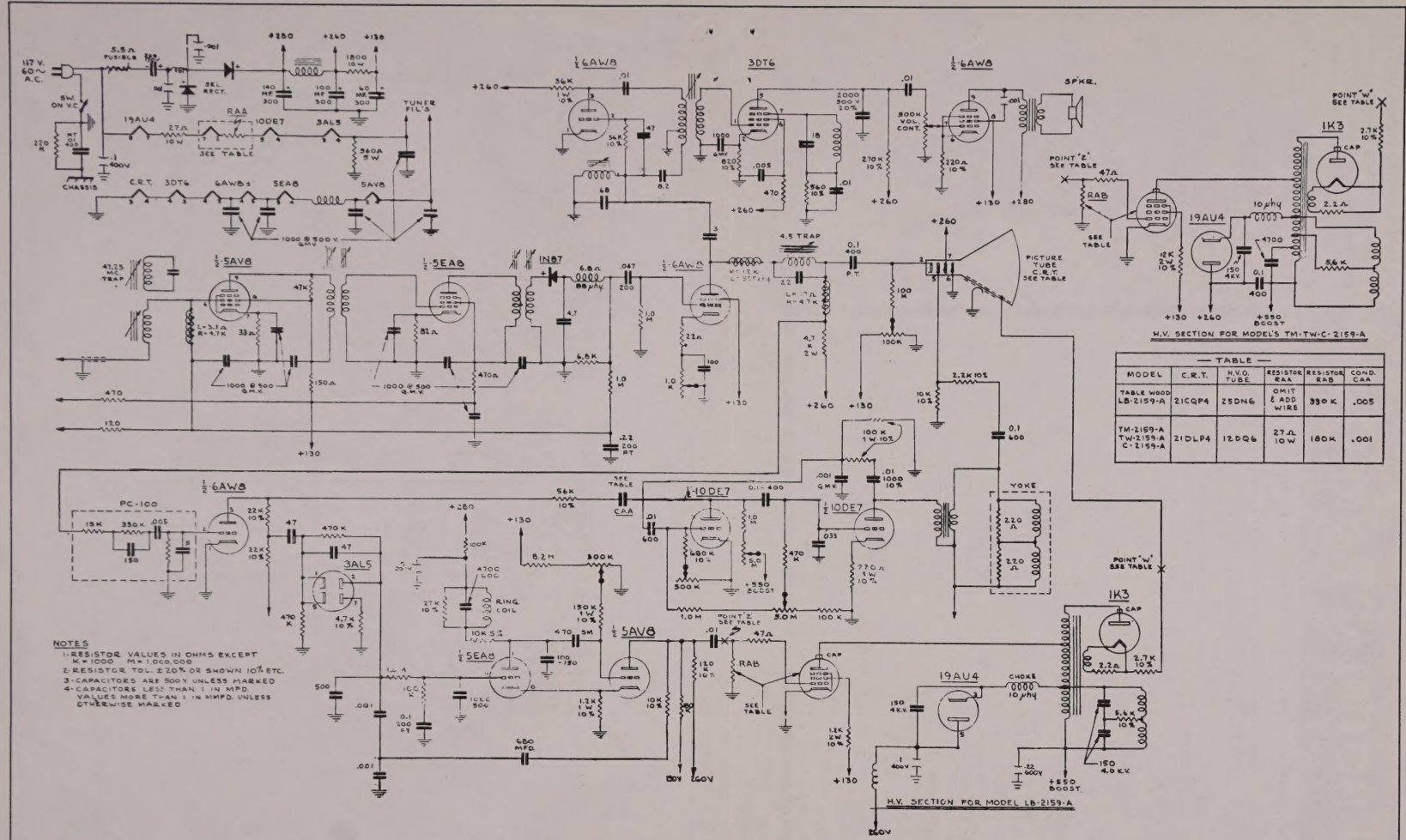
TRADE NAME AND MODEL	SET AND FOLDER NO.
TELEVISION RECEIVERS	
MUNTZ	
17PL, 21CP-1B, M, 21CP-2B, M, 21CP-3B, M, 21CP-4B, M, W (Ch. T37L06, T37L07, T37L07U, T37T06, T37T07, T37T07U)	490-1
TRAV-LER	
921-SP-925B, M, W (Ch. 1053-69, 1057-79)	490-2
PRODUCTION CHANGE BULLETIN	
AIRLINE Tel. Rec.	
WG-4087A, WG-4187A, WG-5081A, WG-5091A, WG-5181A, WG-5191A	490-3
RCA VICTOR Tel. Rec.	
Chassis KCS129H, M, ZAA, ZE, ZH	490-3
STROMBERG-CARLSON Tel. Rec.	
621A Series, 622 Series	490-3
OTHER EQUIPMENT	
AUTOMATIC	
W-89, WP-19	490-4
CAPITOL	
928	490-5
FISHER	
SA-100	490-6
FUJIYA CORDER	
EX-311 (Tape Recorder)	490-7
GROMMES	
20LJ	490-8
KOWA	
KT-31	490-9
MOTOROLA	
SK32W, SK33W, SK35W (Ch. HS-775, HS-776, HS-778)	490-10
SETCHELL-CARLSON	
Chassis RP90A	490-11
SILVERTONE	
55A, 56A, 63A, 64A (Ch. 528.53810, 528.53820)	490-12
SILVERTONE	
69A, 70A, 71A (Ch. 528.53830, 528.59441, 528.59680)	490-13
TOSHIBA	
6TP-314	490-14
TRUETONE	
4DC5908	490-15
TRUETONE	
4DC5960, 4DC5962	490-16
WESTINGHOUSE	
H-57ACS1, H-57ACS2 (Ch. V-2507-3)	490-17
WESTINGHOUSE	
H-715T5, H-716T5 (Ch. V-2400-1)	490-18

This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

Motorola Models 68X11Q, 68X12Q, 68X13Q (Ch. HS-148)

Sonora Models C-2159-A, LB-2159-A, TM-2159-A, TW-2159-A



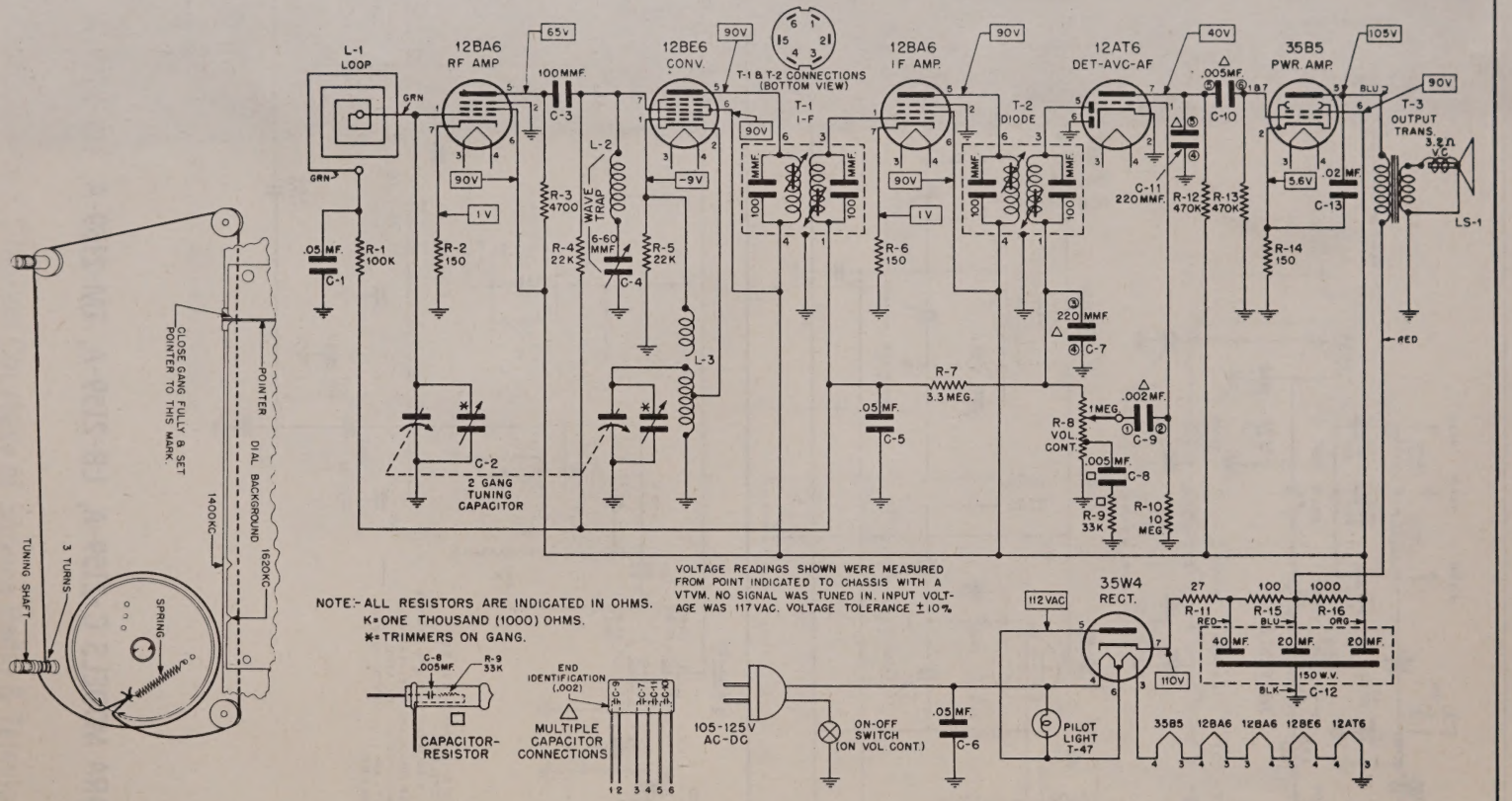
— TABLE —

MODEL	C.R.T.	H.V.O. TUBE	RESISTOR RAA	RESISTOR RAB	COND. CAA
TABLE WOOD LB-2159-A	21CQP4	25DN6	OMIT & ADD WIRE	330 K	.005
TM-2159-A TW-2159-A C-2159-A	21DLP4	12DQ6	27 Ω 10 W	180K	.001

NOTES
1-RESISTOR VALUES IN OHMS EXCEPT K=1000 M=1,000,000
2-RESISTOR TOL. ± 20% OR SHOWN 10% ETC.
3-CAPACITORS ARE 500 V UNLESS MARKED
4-CAPACITORS LESS THAN 1 IN MFD VALUES MORE THAN 1 IN MMFD. UNLESS OTHERWISE MARKED

SONORA MODELS C-2159-A, LB-2159-A, TM-2159-A, TW-2159-A

Schematic Diagram Courtesy of Sonora Radio & Television Corp.



MOTOROLA MODELS 68X11Q, 68X12Q, 68X13Q (CH. HS-148)

Schematic Diagram Courtesy of Motorola Inc.

PHOTOFACT® Folder

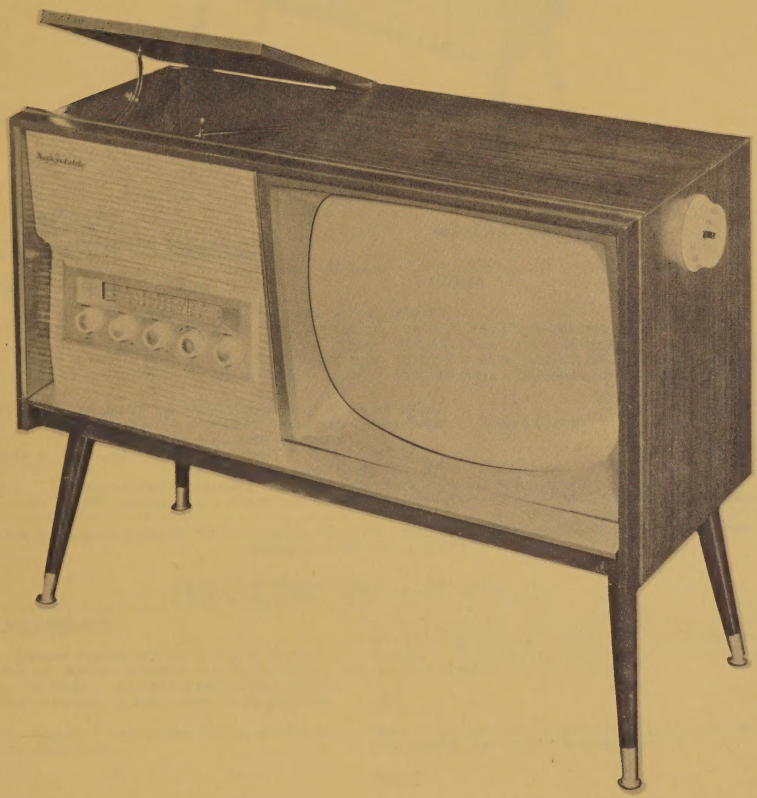
MUNTZ CHASSIS T37LO6, T37LO7, T37LO7U, T37TO6, T37TO7, T37TO7U

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MUNTZ CHASSIS T37LO6, T37LO7, T37LO7U, T37TO6, T37TO7, T37TO7U



MODEL 21CP-3M (CH. T37LO7)

MUNTZ CHASSIS T37LO6, T37LO7, T37LO7U, T37TO6, T37TO7, T37TO7U

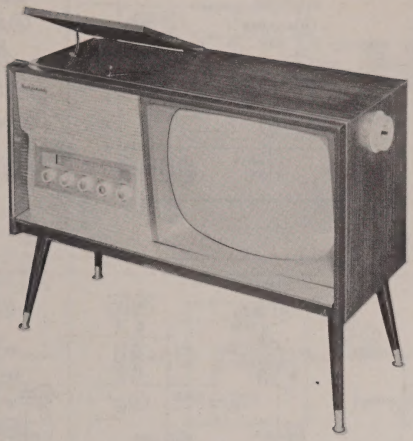
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 490 FOLDER 1

MUNTZ CHASSIS T37LO6, T37LO7, T37LO7U, T37TO6, T37TO7, T37TO7U

MUNTZ CHASSIS T37LO6, T37LO7, T37LO7U, T37TO6, T37TO7, T37TO7U



CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

MODEL 21CP-3M (CH. T37L07)

TRADE NAME	Muntz Models	Chassis
	17PL	T37T06, T37T07, T37T07U
	21CP-1B, M	T37L06, T37L07, T37L07U (With 4 Tube AM Radio)
	21CP-2B, M	T37L06, T37L07, T37L07U (With 7 Tube AM Radio)
	21CP-3B, M	T37L06, T37L07, T37L07U (With 10 Tube FM AM Radio, Part #AS-8016)
	21CP-4B, M, W	T37L06, T37L07, T37L07U (With 4 Tube Stereo Amp., Part #AS-8017)
MANUFACTURER	Muntz TV Inc., 1000 Grey Avenue, Evanston, Illinois	
TYPE SET	Television Receiver (21CP Series with 4 Speed Automatic Record Changer)	
TUBES	TV: VHF - Thirteen, UHF - Fourteen	
POWER SUPPLY	110-120 Volts AC, 60 Cycle	
RATING	TV: 135 Watts, 1.4 Amp. @ 117 Volts AC	
	FM AM Radio: 60 Watts, .55 Amp. @ 117 Volts AC (Less Phono Motor)	
TUNING RANGE	TV: Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

FOR SERVICE INFORMATION ON RECORD CHANGER PART #PH-0020 (WEBCOR MODEL S-170) - SEE SIMILAR UNIT IN PHOTOFACT SET 447 FOLDER 13

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Model 17PL: Remove 3 metal screws at bottom of mask. Remove rear cover. Remove 2 screws on each side of cabinet and 2 screws inside at top holding picture tube mounting. Pull handle straight up and remove safety glass and mask.
Model 21CP-3: Remove 6 wood screws holding molding on front. Remove safety glass.

FUSE

FM-AM Radio: A 3 Amp fuse is used for LV Supply protection. (For location, see M5 in Photo "Radio Chassis - Bottom View".)

FUSE DEVICE (RESISTOR)

TV: A 5Ω fusible is used for low voltage power supply protection. (For location, see R75 in Photo "TV Chassis - Rear View".)

TUNER OSCILLATOR ADJUSTMENTS

Model 17PL: To touch up the VHF Oscillator, it is necessary to remove the chassis. (See "Disassembly Instructions".)

Model 21CP-3: To touch up the VHF Oscillator, it is necessary to remove the rear cover. The adjustments are accessible thru a hole in the right side of the tuner rear cover as viewed from the rear of the tuner.

AGC

The AGC may be varied by means of a local-distant switch. (For location, see "Tube Placement Chart".)

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency Slug B1 (Horizontal Stabilizing Coil).

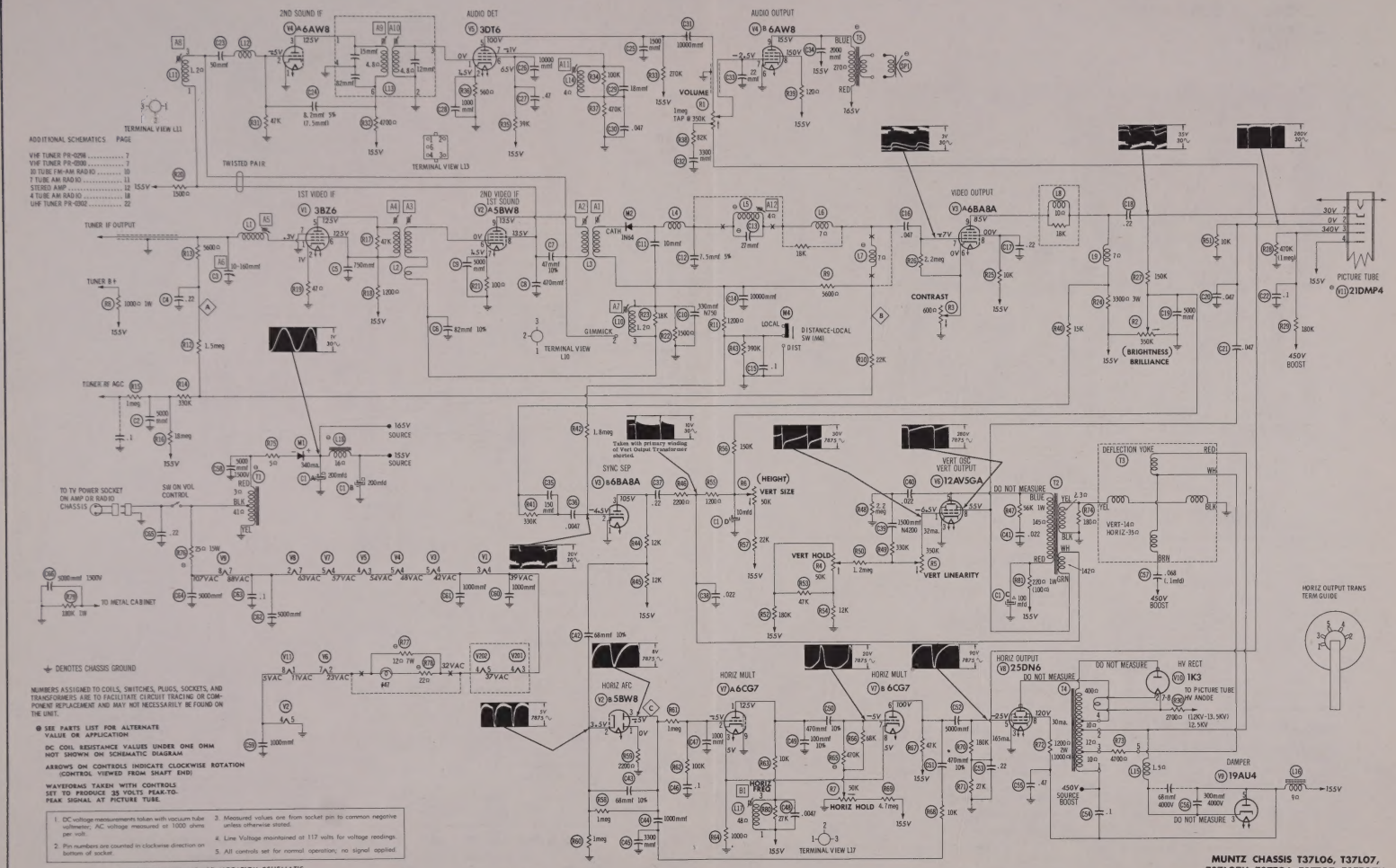
CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JC984


2ND SOUND IF
V4 A 6AW8
AUDIO DET
V5 3DT6
AUDIO OUTPUT
V4 B 6AW8
VOLUME
1meg TAP @ 350K
TERMINAL VIEW L11
TERMINAL VIEW L13
TWISTED PAIR
ADDITIONAL SCHEMATICS PAGE
VHF TUNER PR-0298 7
VHF TUNER PR-0300 7
10 TUBE FM-AM RADIO 10
7 TUBE AM RADIO 11
STEREO AMP 12
4 TUBE AM RADIO 18
UHF TUNER PR-0302 22
1ST VIDEO IF
V1 3BZ6
2ND VIDEO IF
1ST SOUND
V2 A 5BW8
TUNER IF OUTPUT
TUNER B+
TUNER RF AGC
GIMMICK
TERMINAL VIEW L10
CATH
IN64
LOCAL
DISTANCE-LOCAL SW (M4)
DIST
VIDEO OUTPUT
V3 A 6BA8A
CONTRAST
600Ω
BRIGHTNESS
BRILLIANCE
PICTURE TUBE
V11 21DMP4
450V BOOST
TO TV POWER SOCKET ON AMP OR RADIO CHASSIS
SW ON VOL CONTROL
TO METAL CABINET
SYNC SEP
V3 B 6BA8A
VERT OSC VERT OUTPUT
V6 12AV5GA
HEIGHT
VERT SIZE
VERT HOLD
VERT LINEARITY
DO NOT MEASURE
DEFLECTION YOKE
VERT-140 HORIZ-350
HORIZ OUTPUT TRANS TERM GUIDE
HORIZ AFC
V7 B 5BW8
HORIZ MULT
V7 A 6CG7
HORIZ MULT
V7 B 6CG7
HORIZ OUTPUT
V8 25DN6
HV RECT
V10 1K3
TO PICTURE TUBE HV ANODE
DAMPER
V9 19AU4
HORIZ FREQ
HORIZ HOLD
TERMINAL VIEW L17
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 35 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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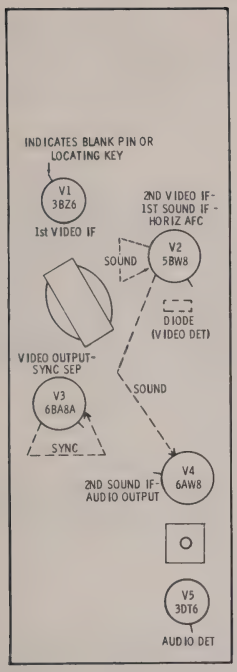
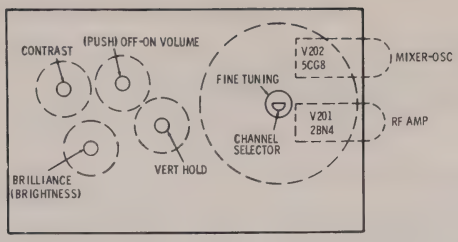
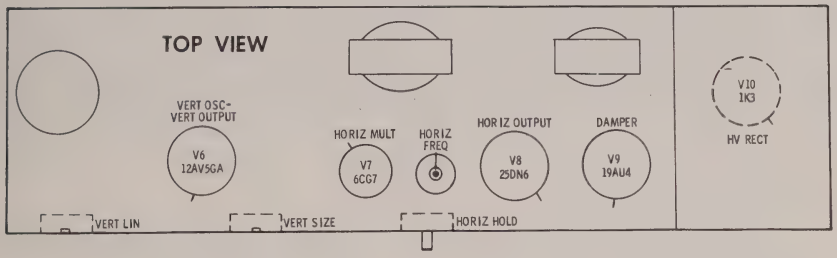
MUNTZ CHASSIS T37L06, T37L07, T37L07U, T37T06, T37T07, T37T07U

TUBE PLACEMENT CHART







TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

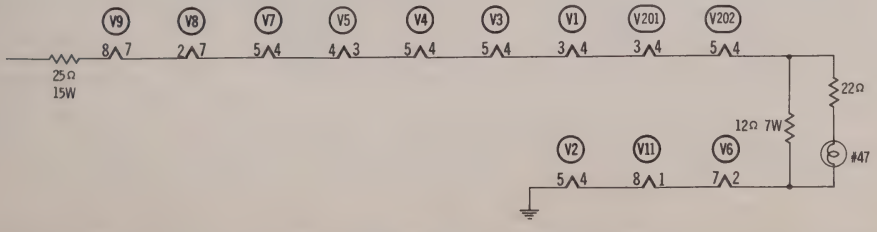
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor, Rectifier (B+)

SWEEP FAILURE
No raster, has sound V7, V8, V9, V10, V11
No vertical deflection V6
Poor vert. linearity or foldover V6
Poor horiz. linearity or foldover V7, V8
Narrow picture V7, V8, V9, Rectifier (B+)
Vert. off freq. V6
Horiz. off freq. V2, V7

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V2, V3, V11
Has pic, no sound V4, V5

SYNC FAILURE
No vert. sync V3
No horiz. sync V2, V3
No vert. or horiz. sync V3

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



TV
ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A1 thru A5 ..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A6 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

VIDEO IF ALIGNMENT

Connect the negative lead of a 5 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side thru .001mfd to pin 6 (grid) of 2nd Video IF. Low side to chassis.	44.0MC (10MC Swp.)	44.25MC	Any non-interfering Channel	Vert. Amp. thru 15K to point (B). Low side to chassis.	A1, A2	Adjust for maximum gain and symmetry of response peaking at approximately 44.25MC.
2.	High side thru .001mfd to pin 1 (grid) of 1st Video IF. Low side to chassis.	"	"	"	"	A3, A4	"
3.	Place a thin insulated metal strip between the Mixer-Osc. tube and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	41.25MC 42.5MC 43.0MC 44.5MC 44.75MC 45.25MC 47.25MC	"	"	A5, A6 and Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Peak A5 at approximately 44.5MC. Adjust A6 to control bandwidth.

SOUND IF ALIGNMENT

Tune in a local TV station and adjust controls for normal picture and sound. Disconnect the antenna lead and couple it loosely for acceptable picture and sound level below Limiter action level. Connect VTVM thru diode probe (Fig. 2) to pin 7 of Audio Detector. Common to chassis. Adjust A7, A8, A9 and A10 for maximum deflection on VTVM (peak A7 and A8 nearest chassis, peak A9 and A10 with maximum core separation). Make sure that signal level is below limiting action of Limiter.
Disconnect diode probe and VTVM and connect antenna for a strong signal. Adjust A11 for maximum volume and MINIMUM distortion.
Repeat entire procedure if necessary for best sound.

4.5MC TRAP ALIGNMENT FOR 21" MODELS

Tune in a strong TV signal and set Contrast at maximum. Adjust the Fine Tuning until a beat pattern is visible. Adjust A12 for MINIMUM beat interference.

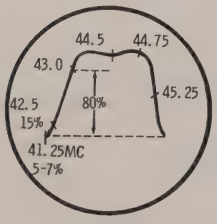


FIG. 1

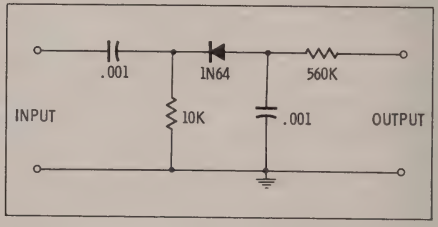


FIG. 2

VHF TUNER ALIGNMENT INSTRUCTIONS

PR—0298

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A213, A214, A215 ..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
		207MC	205.25MC 209.75MC	12		A202	
		201MC	199.25MC 203.75MC	11		A203	
		195MC	193.25MC 197.75MC	10		A204	
		189MC	187.25MC 191.75MC	9		A205	
		183MC	181.25MC 185.75MC	8		A206	
		177MC	175.25MC 179.75MC	7		A207	
		85MC	83.25MC 87.75MC	6		A208	
		79MC	77.25MC 81.75MC	5		A209	
		69MC	67.25MC 71.75MC	4		A210	
		63MC	61.25MC 65.75MC	3		A211	
		57MC	55.25MC 59.75MC	2		A212	

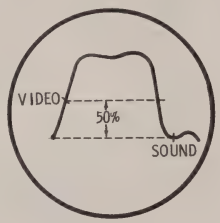


FIG. 201

RF AND MIXER ALIGNMENT

Connect the negative lead of a variable bias supply to point Ⓣ. Positive to chassis. Set bias for 2.5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Ⓤ. Common to chassis.	A213, A214, A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope.
3.	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
		207MC	205.25MC 209.75MC	12		A217	
		201MC	199.25MC 203.75MC	11		A218	
		195MC	193.25MC 197.75MC	10		A219	
		189MC	187.25MC 191.75MC	9		A220	
		183MC	181.25MC 185.75MC	8		A221	
		177MC	175.25MC 179.75MC	7		A222	
		85MC	83.25MC 87.75MC	6		A223	
		79MC	77.25MC 81.75MC	5		A224	
		69MC	67.25MC 71.75MC	4		A225	
		63MC	61.25MC 65.75MC	3		A226	
		57MC	55.25MC 59.75MC	2		A227	

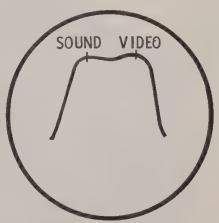


FIG. 202

VHF TUNER PARTS LIST AND DESCRIPTIONS

PR–0298

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	2BN4	V202	Mixer-Osc.	5CG8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	470 1500V		HVD-15-470	DD30-471	HVB20D15	3CCD-471	2HV-347	30GA-T47
C202	470 1500V		HVD-15-470	DD30-471	HVB20D15	3CCD-471	2HV-347	30GA-T47
C203	120 N750 10%			TCN-120	C10T12U	CCTN-121	CN7-312	10TCU-T12
C204	30							
C205A	15 N150 7%					*		10TCP-Q15
B	15 N150 7%					*		10TCP-Q15
C206	1000		EF-001	MFT-1000		CCF-102	CT280A	
C207	.5-10							
C208	47							
C209	.27 10%							
C210	2-6			829-6		CV-3	CT552	
C211	1 10%		NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V10
C212	51 N750 10%			TCN-51	C10Q51U			
C213	2-6			829-6		CV-3	CT552	
C214	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C215	30							
C216								
C217	4.7		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C218	13			DD-120	C10Q13C	CCTO-120	CNO-412	10TCC-Q12
C219	1000		EF-001	MFT-1000		CCF-102	CT280A	
C220	1000		EF-001	MFT-1000		CCF-102	CT280A	
C221	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C222	1000		EF-001	MFT-1000		CCF-102	CT280A	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

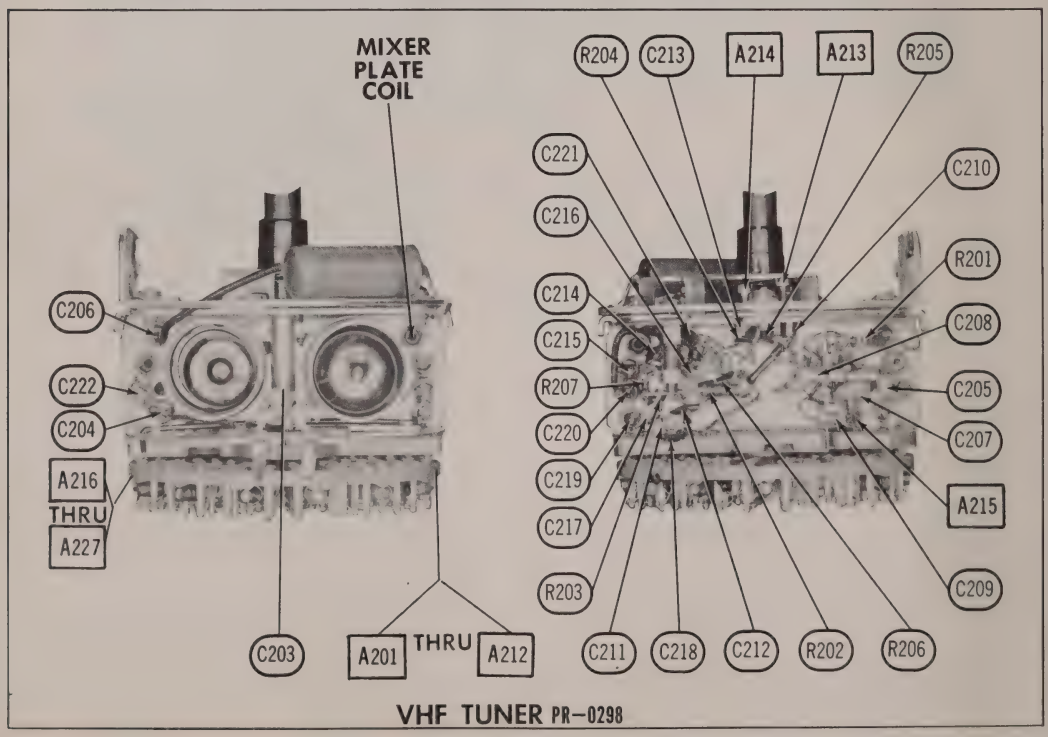
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

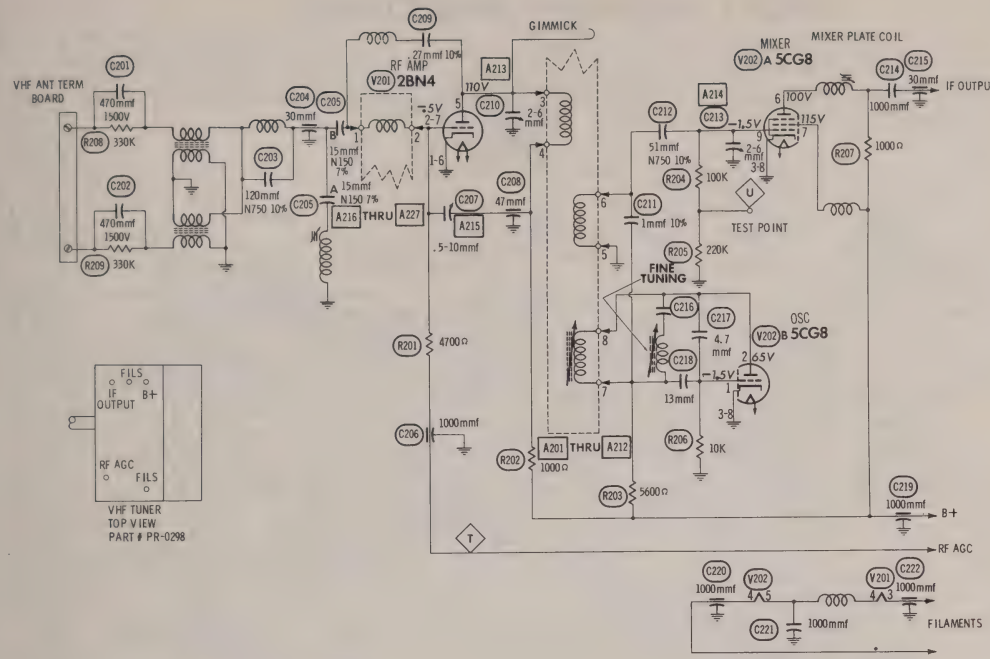
ITEM No.	RATING	REMARKS
R201	4700Ω	
R202	1000Ω	
R203	5600Ω	

ITEM No.	RATING	REMARKS
R204	100K	
R205	220K	
R206	10K	

ITEM No.	RATING	REMARKS
R207	1000Ω	
R208	330K	
R209	330K	



VHF TUNER PR–0298



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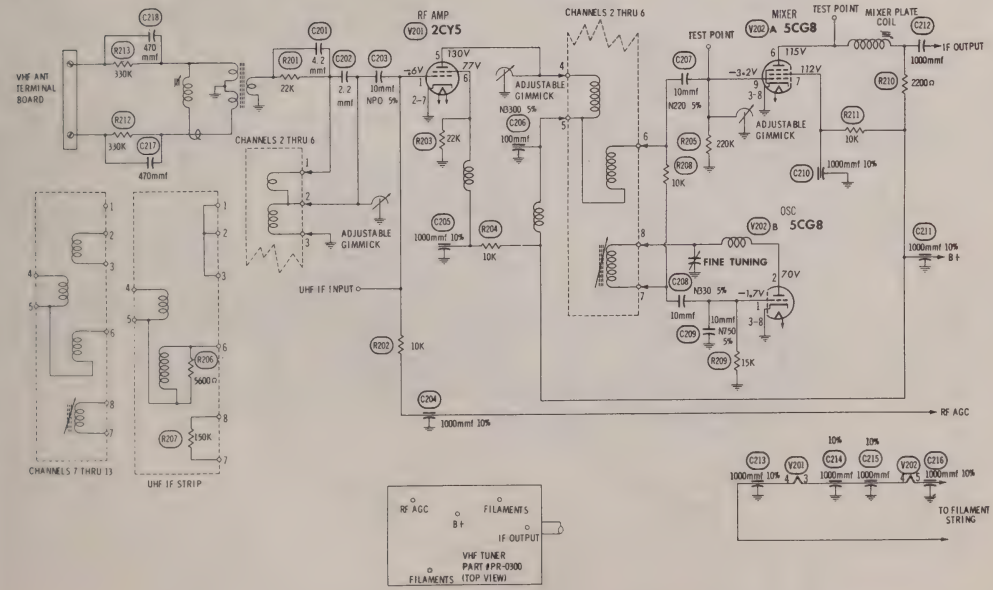
VHF TUNER PR-0298



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VHF TUNER PR-0300

RADIO ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Suggested Alignment Tools: A13 thru A16, A19 thru A26 ... GENERAL CEMENT #5097, 8727
WALSCO #2515
A17, A18, A28 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Conv. Low side to chassis.	455KC (400∿ Mod.)	AM Tuning gang fully open	Across voice coil	A13, A14, A15, A16	Adjust for maximum output. (A13 and A14 not used in Model 21CP-1.)
2.	Loop	1600KC	1600KC	"	A17	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1400KC	1400KC	"	A18	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru .001mfd to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	FM Point of non-interference	DC probe to point ◇D◇. Common to chassis.	A19, A20, A21, A22, A23, A24, A25	Adjust for maximum deflection.
5.	"	"	"	DC probe to point ◇E◇. Common to chassis.	A26	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru .001mfd to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	FM Point of non-interference	Vert. Amp. to point ◇D◇. Low side to chassis.	A19, A20, A21, A22, A23, A24, A25	Disconnect stabilizing capacitor C68. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. Reconnect C68.
5.	"	"	"	Vert. Amp. to point ◇E◇. Low side to chassis.	A26	Adjust to place marker at the center of crossover lines similar to Fig. 4. SLIGHTLY retouch A19 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	100MC (Unmod.)	FM 100MC	DC probe to point ◇D◇. Common to chassis.	A27, A28	Adjust for maximum deflection.

FIG.3

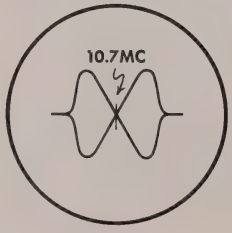
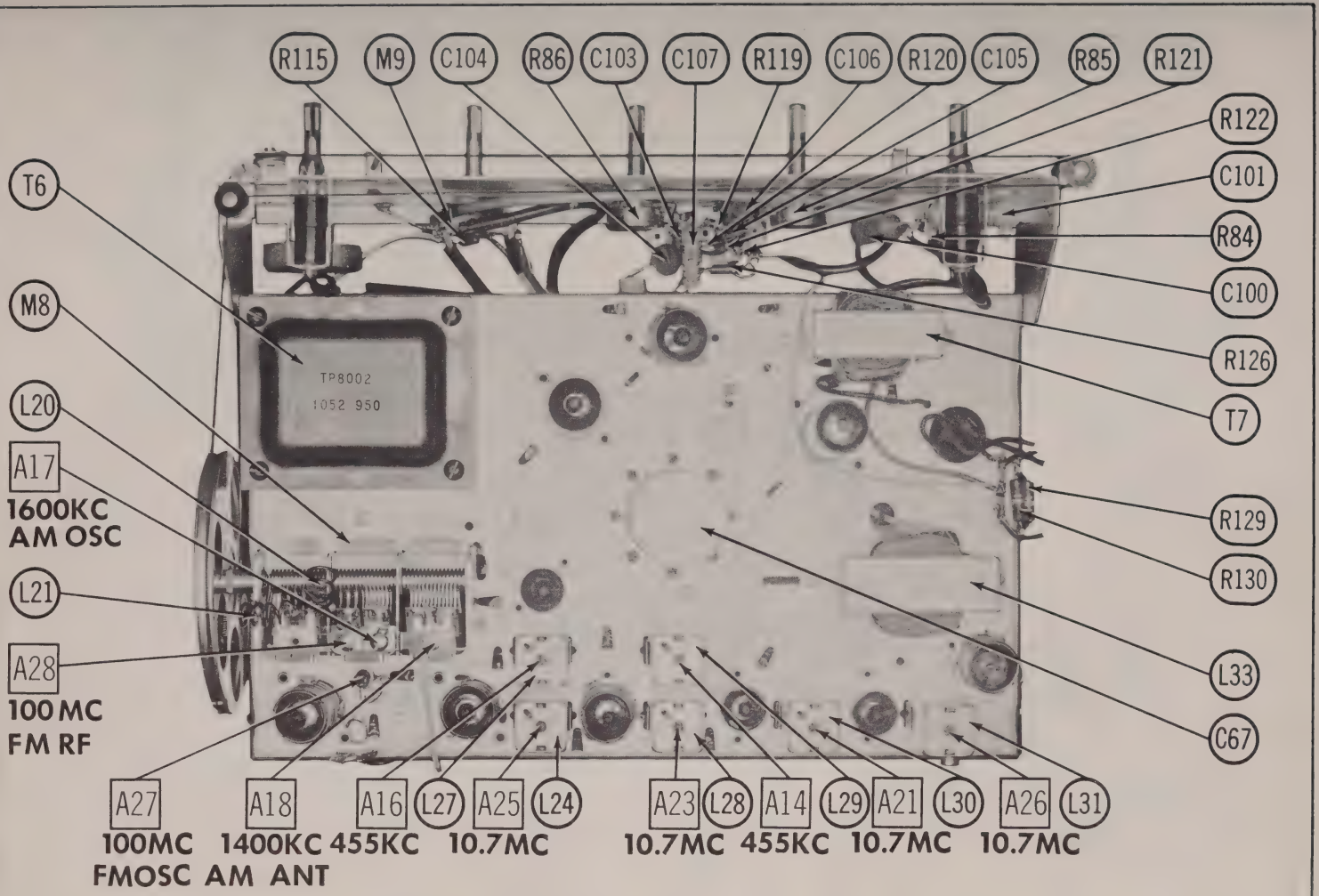
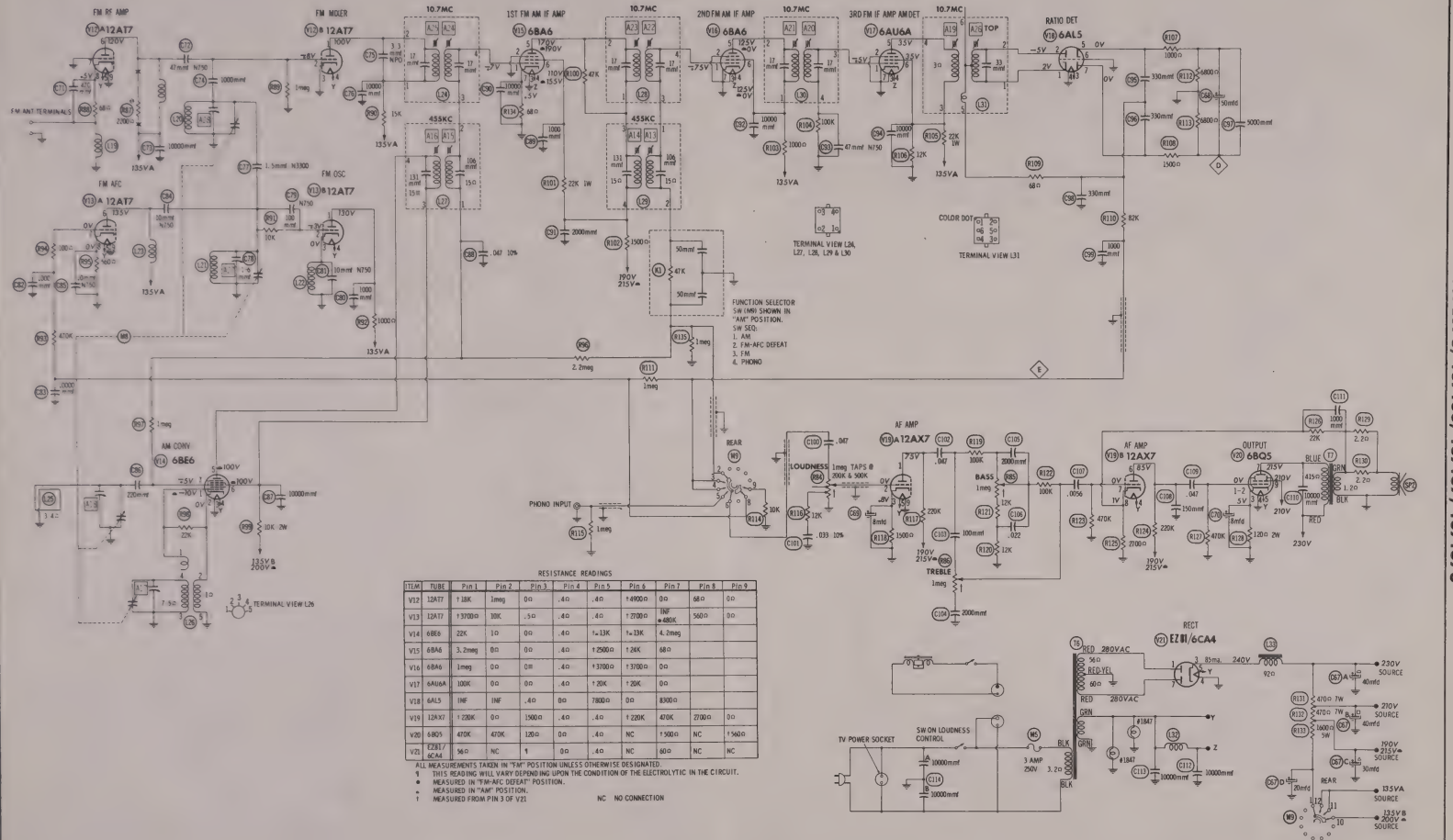


FIG. 4



FM AM RADIO CHASSIS - TOP VIEW

MUNTZ CHASSIS T37L06, T37L07,
T37L07U, T37T06, T37T07, T37T07U



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V12	12AT7	†18K	1meg	0Ω	.4Ω	.4Ω	†4900Ω	0Ω	68Ω	0Ω
V13	12AT7	†3700Ω	10K	.5Ω	.4Ω	.4Ω	†2700Ω	INF • 480K	560Ω	0Ω
V14	6BE6	22K	1Ω	0Ω	.4Ω	†=13K	†=13K	4.2meg		
V15	6BA6	3.2meg	0Ω	0Ω	.4Ω	†2500Ω	†24K	68Ω		
V16	6BA6	1meg	0Ω	0Ω	.4Ω	†3700Ω	†3700Ω	0Ω		
V17	6AU6A	100K	0Ω	0Ω	.4Ω	†20K	†20K	0Ω		
V18	6AL5	INF	INF	.4Ω	0Ω	7800Ω	0Ω	8300Ω		
V19	12AX7	†220K	0Ω	1500Ω	.4Ω	.4Ω	†220K	470K	2700Ω	0Ω
V20	6BQ5	470K	470K	125Ω	0Ω	.4Ω	NC	†500Ω	NC	†560Ω
V21	EZ81/ 6CA4	56Ω	NC	†	0Ω	.4Ω	NC	60Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• MEASURED IN "FM-AFC DEFEAT" POSITION.
▪ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN 3 OF V21 NC NO CONNECTION

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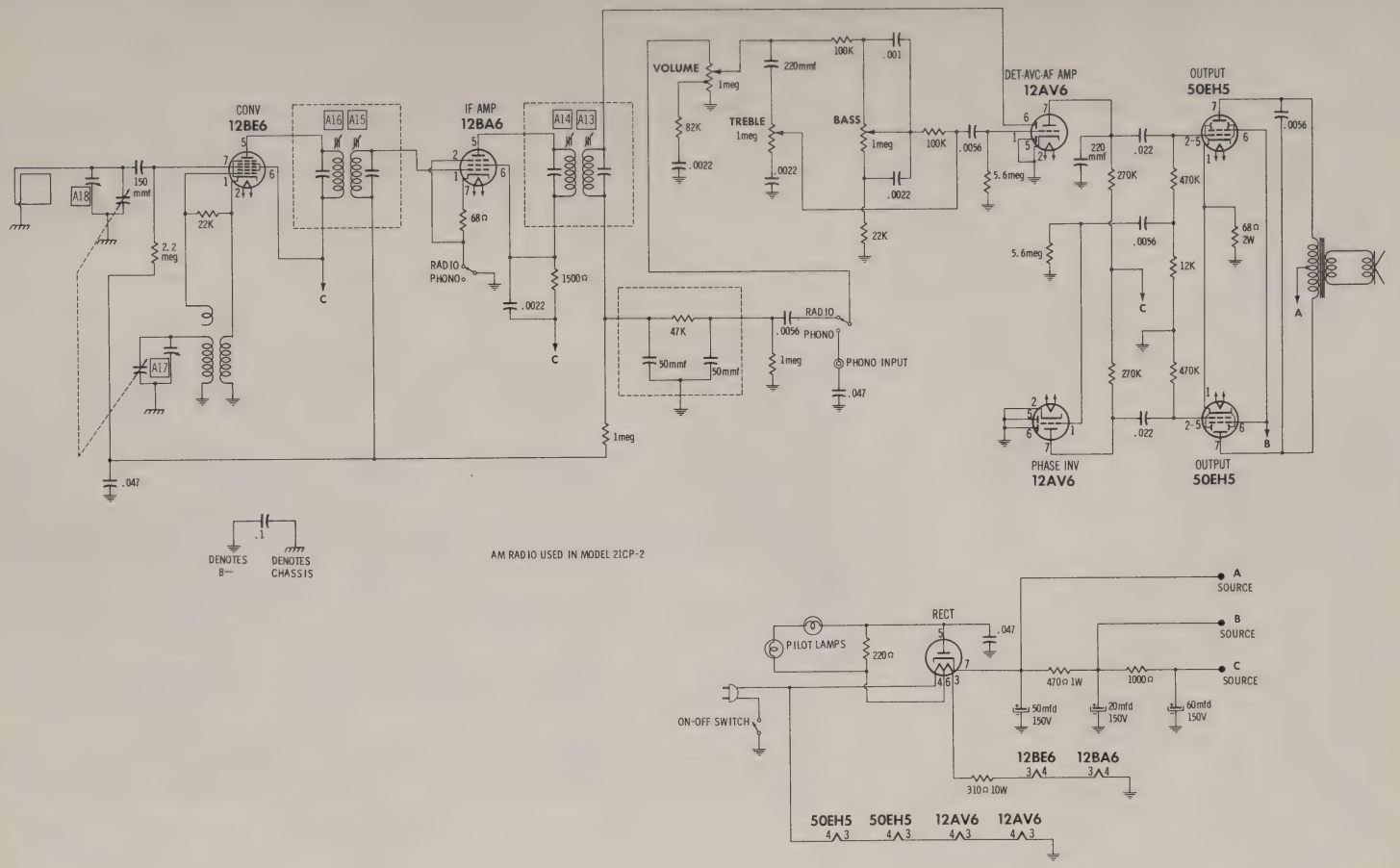
FM AM RADIO CHASSIS USED IN TV COMB. MODEL 21CP-3



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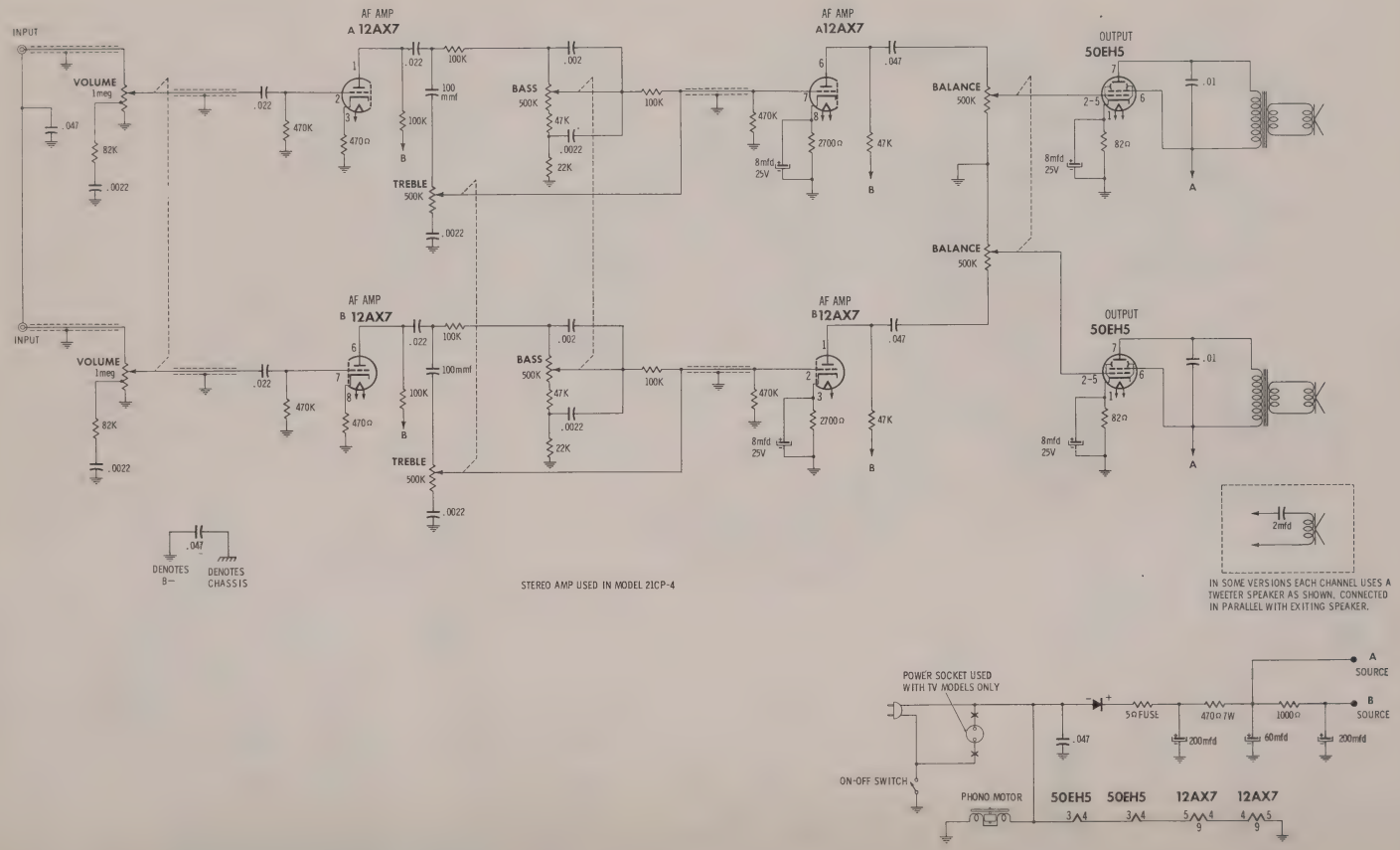
AM RADIO CHASSIS USED IN TV COMB. MODEL 21CP-2

MUNTZ CHASSIS 13TL06, 13TL07, 13TL07U, 13TT06, 13TT07, 13TT07U



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STEREO AMP CHASSIS USED IN TV COMB. MODEL 21CP-4

TV PARTS LIST AND DESCRIPTIONS

TUBES

CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	1st Video IF Amp.	3BZ6	V6	Vert. Osc. - Vert. Output	12AV5GA
V2	2nd Video IF Amp. -1st Sound IF Amp. -Horiz. AFC	5BW8	V7	Horiz. Mult.	6CG7
V3	Video Output - Sync Sep.	6BA8A	V8	Horiz. Output	25DN6
V4	2nd Sound IF -Audio Output	6AW8	V9	Damper	19AU4
V5	Audio Det.	3DT6	V10	HV Rect.	1K3

PICTURE TUBE

ITEM No.	REPLACEMENT DATA					NOTES
	MUNTZ PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
V11	21DMP4 17DTP4				21DMP4 ①	① Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MUNTZ PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲200	200	CE-0042	AFH4-39-50			TMQ-188	TVLS-4440.3*	
B	■200	200							
C	▲100	200							
D	10	75							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					
				AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	5000			BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C3	10-160		#CT-0023						
C4	.22	200V		P288N-22		CUB2P22	2DP-2-224	GEM-2022	2TM-P22
C5	750			DI-750	DI-751	L10T75	CCD-751	GP375	10TS-T75
C6	82	10%		DI-82	DD-820	L10Q82	CCD-820	GP482	10TS-Q82
C7	47	10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C8	470			BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TS-T47
C9	5000			BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C10	330	N750		N750-DI 330	DTN-330	C10T33U		CN7-333	10TCU-T33
C11	10			NPO-SI 10	TCZ-10	C10V10C	CCTO-100	CNO-410	10TCC-Q10
C12	7.5	5%	#CC-0153						
C13	27		Note 1	NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C14	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C15	.1	200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C16	.047	200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C17	.22	200V		P288N-22		CUB2P22	2DP-2-224	GEM-2022	2TM-P22
C18	.22	200V		P288N-22		CUB2P22	2DP-2-224	GEM-2022	2TM-P22
C19	5000			BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C20	.047	200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C21	.047	600V		P288N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C22	.1	600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P1
C23	50			SI 50	D6-500	L10Q5	CCD-500	GP450	10TS-Q50
C24	8.2	5%	(7.5mmf) †	NPO-SI 8.2		C10V82C			10TCC-V82
C25	1500			BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C26	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C27	.47	200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C28	1000			BPD-001	DD-103	BYA10D1	CCD-102	GP210	5HK-D10
C29	18			NPO-DI 20	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18
C30	.047	200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C31	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C32	3300			BPD-0033	DD-332	BYA10D33	CCD-332	GP233	5HK-D33
C33	22			SI 22	D6-220	L10Q22	CCD-220	GP422	10TS-Q22
C34	2000			BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C35	150			BPD-00015	DD-151	L10T15	CCD-151	GP315	10TS-T15
C36	.0047	600V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C37	.22	200V		P288N-22		CUB2P22	2DP-2-224	GEM-2022	2TM-P22
C38	.022	200V		P288N-022	DD-203	CUB2P22	4DP-2-223	GEM-4122	2TM-S22
C39	1500	N4200					*		
C40	.022	600V		P688N-022	DD-203	CUB6S22	6DP-2-223	GEM-6122	6TM-S22
C41	.022	600V		P688N-022	DD-203	CUB6S22	6DP-2-223	GEM-6122	6TM-S22
C42	68	10%		DI-68	DD-680	L10Q68	CCD-680	GP468	10TS-Q68
C43	68	10%		DI-68	DD-680	L10Q68	CCD-680	GP468	10TS-Q68
C44	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C45	3300			BPD-0033	DD-332	BYA10D33	CCD-332	GP233	5HK-D33
C46	.1	200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C47	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C48	.0047	600V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C49	100	10%		NPO-SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C50	470	10%		1469-00047		5R5T47	CM-19B-471K	MCJ470	MS-347
C51	470	10%		1469-00047		5R5T47	CM-19B-471K	MCJ470	MS-347
C52	5000			BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C53	.22	200V		P288N-22		CUB2P22	2DP-4-224	GEM-2022	2TM-P22
C54	.1	400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C55	.47	200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C56	300	4000V		HVD-60-330	DD60-301	HVB50T33	6CCD-331	6HV-333	60GA-T30
C57	.068	600V	(.1mfd) †	P688N-068		CUB6S68	6DP-4-683	GEM-6168	6TM-S68
C58	5000	1500V		HVD-15-5000	DD30-502	HVC15D15	3CCD-502	2HV-215	BL-D50
C59	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C60	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C61	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C62	5000			BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
CS3	.1 400V		P488N-1	DF-104	CU-B4P1	402P-3-104	GEM-401	4TM-P1
CS4	5000		BPD-005	DD-502	BYA502D5	CUD-502	GP250	5HK-D50
CS5	.22 600V		P488N-22	CUB5P22	HVC1K5X5	3CUD-502	GEM-6032	5TM-P22
CS6	5000 1500V		HVD-15-5000	DD50-502	HVC1K5X5	3CUD-502	2HV-B5	BL-050

Note 1. Not used in Model 17PL. # Musts Part Number. † Alternate Value.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MUNTZ PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS—IRC PART No.	MALLORY PART No.	
R1A	1meg	½	VC-0089			B13-129X		Volume
B	350K Tap							
	Shaft					SK1		
C	Switch							Push-Pull Off-On
R2A	350K	½	VC-0066	AB-59	B47-500K-S	B11-132	PTA55L	Brilliance (Brightness)
B	Shaft			AK-18	Not Req.	TM4	Not Req.	
R3A	500Ω	½	VC-0064	AB-4	B47-500-S	B11-103	PTA52L	Contrast
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R4A	50K	½	VC-0067	AB-31	B47-40K-S	B11-123	PTA54L	Vert. Hold
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R5A	350K	½	VC-0065	AB-59	B47-500K-S	B11-132	PTA55L	Vert. Linearity
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R6A	80K	½	VC-0068	BK-31	B47-80K-S	B11-133	PTA54L	Vert. Size (Height)
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R7A	50K	½	VC-0063-1	AB-31	B47-50K-S	B11-123	PTA54L	Horiz. Hold
B	Shaft			AK-1	Not Req.	TM4	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R8	1000Ω 1W	
R9	5600Ω	
R10	22K	
R11	12000Ω	
R12	1.5meg	
R13	5600Ω	
R14	330K	
R15	1meg	
R16	1.8meg	
R17	4.7K	
R18	12000Ω	
R19	470Ω	
R20	1500Ω	
R21	100Ω	
R22	1500Ω	
R23	18K	
R24	12000Ω 2W	
R25	10K	
R26	2.2meg	
R27	150K	
R28	470K	(1meg) ◆
R29	180K	
R30	2700Ω	
R31	47K	
R32	4700Ω	

ITEM No.	RATING	REMARKS
R33	270K	
R34	100K	
R35	39K	
R36	560Ω	
R37	470K	
R38	82K	
R39	120Ω	
R40	15K	
R41	330K	
R42	1.8meg	
R43	390K	
R44	12K	
R45	13K	
R46	2200Ω	
R47	56K 1W	
R48	2.2meg	
R49	330K	
R50	1.5meg	
R51	10K	
R52	180K	
R53	47K	
R54	13K	
R55	1200Ω	
R56	150K	
R57	22K	

ITEM No.	RATING	REMARKS
R58	1meg	
R59	2200Ω	
R60	1meg	
R61	1meg	
R62	100K	
R63	10K	
R64	1000Ω	
R65	470K	①
R66	68K	
R67	47K	
R68	10K	
R69	4.7meg	
R70	180K	
R71	27K	
R72	1300Ω 2W	(1000Ω) ◆
R73	4700Ω	
R74	180Ω	
R75	9Ω	#RW-006-15
R76	25Ω 15W	②
R77	13Ω 7W	#RW-012-17 ③
R78	22Ω	③
R79	180K 1W	
R80	27K	
R81	2250 1W	(100Ω) ◆

Musts Part Number
◆ Value used in Model 17PL.

‡ May not be used in some versions.
① Not used in Model 17PL.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MUNTZ PART No.	Gramer PART No.	Messner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	1st Video IF	LC-0102	17-4534	17-4534	TV-131	6226	VF-4	
L2	2nd Video IF	LC-0103	17-4532	17-4532				
L3	3rd Video IF	LC-0104	17-4523	17-4523				
L4	RF Choke	LC-0091	19-1008	19-1008	SW-631	4609		4.7uh
L5	4.5MC Trap	LC-0107	20-1007	20-1007	TV-151	1469	SF-3	①
L6	Series Peaking Coil	LC-0101-1	19-3125	19-3125	TV-195	6153	VP-4	120uh
L7	Shunt Peaking Coil	LC-0101-1	19-3125	19-3125	TV-195	6153	VP-4	120uh ②
L8	Series Peaking Coil	LC-0101-2	19-3250 *	19-3250 *	TV-185 *	6130 *	VP-6 *	270uh ②
L9	Shunt Peaking Coil	LC-0101-1	19-3125	19-3125	TV-195	6153	VP-4	120uh
L10	1st Sound IF	LC-0105	17-3403	17-3403	TV-151	1469	SF-3	
L11	2nd Sound IF	LC-0106	17-3403	17-3403	TV-151	1469	SF-3	
L12	RF Choke	LC-0091	19-1008	19-1008	SW-631	4609		4.7uh
L13	3rd Sound IF	LC-0051						
L14	Quadrature Coil	LC-0107	20-1007	20-1007	TV-151	1469	SF-3	
L15	RF Choke	LC-0098	19-1005	19-1005	BC-566	4613		10uh
L16	RF Choke	LC-0097	19-1050	19-1050	BC-551	6302		2MH

‡ Not used in Model 17PL.
* Parallel with 18K Resistor
③ Wound on 18K Resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA					NOTES
	PRI.	SEC.	MUNTZ PART No	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L17	48Ω		LO-0077	HS-5	TV-163	6210	H-102	HS-5	Horiz. Stabilizer

FILTER CHOKE

ITEM No	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~/.)	MUNTZ PART No	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L18	330A	16Ω	43 Hy.	LC-0100-3 ①				C-2343 ②		C-28X ②

① Alternate Part #LC-0100-3.
② Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No	RATING		REPLACEMENT DATA						
	PRI.	SEC. ?	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	120V ② 680A Tap ③ 117V ④ 1.4A		TP-0034-1 ①						

① Alternate Part #TP-0031, TP-0034.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA							
		MUNTZ PART No	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Oscillator and Output	TO-0056							
T3	Yoke-Horiz. (16MH) (10°)-Vert. (14.6MH)	LC-0106	Y-52 ①		Y-110 ①		DY-27A ①	Y-52 ①	Y-60 & YC-110
	Rear Cover and Centering Device	PR-0396							YC-110
	Alt. Rear Cover and Centering Device	PR-0304							
	Yoke Clamp	HP-0079							
T4	Horiz. Output	TO-0055							D-177

① Remove Horiz. and Vert. Damping Networks from Yoke. Use original rear cover and centering device.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	7500Ω	3-4Ω	TO-0049-3 ①	26548	A-3020 ②	AU-604	A-3849	26548	S-92X ②	

① Alternate Part #TO-0049-2.
② Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MUNTZ PART No.	QUAM PART No.	
SP1	6"	PM	6-8Ω	SK-0023-3	8A2Z6.8	One used in Model 21CP-3, two used in Model 21CP-4.
	8"	PM	3-4Ω	SK-0023-1	8A4	One used in Model 17PL.
	34"	PM	4-8Ω	SK-0031	34IST24.4	Two used in Model 21CP-4.

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT (Measured)	MUNTZ PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.		
M1	.340A	CX-0037	5K4	HA-504	40K	SR-500		Silicon Type

CRYSTAL DIODES

ITEM No.	ORIG TYPE	REPLACEMENT DATA				NOTES
		MUNTZ PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N64	CX-0026	1N64	1N60	1N64	

MISCELLANEOUS

ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M3	Tuner	PR-0298	VHF
	Tuner	PR-0298-1	VHF
	Tuner	PR-0300	VHF
	Tuner	PR-0302	UHF
	Antenna	PR-0299	Model 17PL, JFD Replacement Type #TA-380.
M4	Switch	SW-0030	Local-Distant (Slide Type SPDT)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	WG-0020-4	21" Models
Safety Glass	WG-0023	17" Model
Mask	RS-0078	

CABINETS & CABINET PARTS (cont)

NAME	PART NO	DESCRIPTION
Knob	GE-0023	Gear, Channel Selector, 21" Models
Knob	GE-0023-1	Gear, Channel Selector, 17" Model
Knob	KB-0080	UHF Tuning, 21" Models
Knob	KB-0080-1	UHF Tuning, 17" Model
Knob	KB-0079	Fine Tuning & Contrast
Knob	KB-0081	UHF Channel Indicator, 21" Models
Knob	KB-0081-1	UHF Channel Indicator, 17" Model
Knob	KB-0079	Brightness & Vertical Hold, 21" Models
Knob	KB-0079-3	Brightness & Vertical Hold, 17" Model
Knob	KB-0078-3	Volume
Knob	KB-0005	Base, Treble, Off-On Switch
Glass	DG-0003	Dial Scale, FM-AM Radio #AS-8016
Dial Pointer	PR-0007	FM-AM Radio #AS-8016
Cabinet	CW-0106	Walnut, Model 21CP-4
Cabinet	CW-0105-3	Mahogany, Model 21CP-4
Cabinet	CW-0105-4	Blonde, Model 21CP-4
Cabinet	CW-0107	Walnut, Model 21CP-3
Cabinet	CW-0107-2	Mahogany, Model 21CP-3
Cabinet	CW-0107-4	Blonde, Model 21CP-3
Cabinet Legs	AS-0538	Assembly Model 21CP-3 (Black)
Cabinet Legs	AS-0538-1	Assembly Model 21CP-3 (Mahogany)
Cabinet Legs	AS-0530	Assembly Model 21CP-4, 5" Brass with Plate and Front Rail
Cabinet Handle	HA-0104	Model 17PL

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8480 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

RADIO PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	◆ CBS ◆ USE	TYPE	ITEM No.	◆ GENERAL ELECTRIC ◆ USE	TYPE	ITEM No.	◆ RAYTHEON ◆ USE	TYPE	ITEM No.	◆ SYLVANIA ◆ USE	TYPE
V13	FM RF Amp. - FM Mixer	12AT7	V17	3rd FM IF Amp. - AM Det.	6AU8A						
V14	FM Osc. - FM AFC	12AT7	V18	Ratio Det.	6AL5						
V1A	AM Converter	6BE6	V19	AF Amp.	12AX7						
V15	1st FM-AM IF Amp.	6BA6	V20	Output	6BQ6						
V16	2nd FM-AM IF Amp.	6BA6	V21	Rectifier	6Z3H/6CA4						

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							
	CAP.	VOLT.	MUNTZ PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C67A	40	350	CE-8002	AFH4-06-40	D0054		FP438.4	TVQ-119	TVL-4674	
B	40	350								
C	30	350								
D	20	350								
C68	5	50	CE-8100	PRS310	BBR5-50	TC30	TD-5-50	TVA-1303		
C69	5	25	CE-0018	PRS405	BBR5-150	TT-25X5	TD-5-150	TVA-1405		
C70	5	25	CE-0018	PRS405	BBR5-150	TT-25X5	TD-5-150	TVA-1405		

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA						
				AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C71	470			BPD-00047	DD-471	BYA10T47	CCD-471	GP347	10TS-T47	
C72	47	N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47	
C73	10000			BPD-01	BYA10D	DD-103	CCD-103	GP10	5HK-S10	
C74	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP20	5HK-D10	
C75	3.3	NPO		NPO-DI 3.3	DYZ-3R3	C10V33C	CCPO-3R3	CNO-533	10TCC-Y33	
C76	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP10	5HK-S10	
C77	1.5	N3300	#CC-0204				*			
C78	1.5		#CT-0022		228-6					
C79	100	N750		N750-SI 100	TCN-100	C10TU	CCTN-101	CN7-310	10TCU-T10	
C80	1000			BPD-001	DD-102	BYA10D2	CCD-103	GP20	5HK-D10	
C81	10	N750		N750-DI 10	DTN-10	C10QU	CCTN-100	CN7-410	10TCU-Q10	
C82	1000			BPD-001	DD-102	BYA10D1	CCD-102	GP20	5HK-D10	
C83	10000			BPD-01	DD-103	BYA10S1	CCD-103	GP10	5HK-S10	
C84	10	N750		N750-DI 10	DTN-10	C10QU	CCTN-100	CN7-410	10TCU-Q10	
C85	10	N750		N750-DI 10	DTN-10	C10QU	CCTN-100	CN7-410	10TCU-Q10	
C86	220			DI-220	DD-221	L10T22	CCD-221	GP10	10TS-T22	
C87	10000			BPD-01	DD-503	BYA10S1	CCD-103	GP10	5HK-S10	
C88	.047	200V 10%		P288N-047	DD-503	CUB2M47	4DP-3-473	GEM-4147	2TM-S47	

RADIO PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C89	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C90	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C91	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C92	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C93	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C94	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C95	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C96	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C97	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C98	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C99	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C100	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C101	.033 400V 10%		V84C4S33-10%	DD-303	PMS33	4DP-3-333	GEM-1613	4TM-S33
C102	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C103	100		SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C104	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20.
C105	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C106	.022 200V		P288N-022	DD-203	CUB4S22	4DP-2-223	GEM-2122	4TM-S22
C107	.0056 200V			D6-562		6DP-1-562	GEM-16256	5BF-D56
C108	150		BPD-00015	DD-151	L10T15	CCD-151	GP315	10TS-T15
C109	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C110	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C111	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C112	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C113	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C114A	10000		BPD-2X01	DD3-103	BYD6DS1	CCD-103	B2X110	5HK-2S10
B	10000					CCD-103		

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
# Muntz Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MUNTZ PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R84A	1meg *	½	VC-8006	BT-165		QI8-137XX	UDT-289	Loudness
B	Switch			KR-1		76-1	US-26	Power Off-On
R85A	1meg	½	VC-8005	B-69	A47-1meg-S	QI1-137	U54	Bass
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	
R86A	1meg	½	VC-8005	B-69	A47-1meg-S	QI1-137	U54	Treble
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	

* Taps @ 200K and 500K.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R87	2200Ω	Note 1
R88	68Ω	
R89	1meg	
R90	15K	
R91	10K	
R92	1000Ω	
R93	470K	
R94	100Ω	
R95	560Ω	
R96	2.2meg	
R97	1meg	
R98	22K	
R99	10K 2W	
R100	47K	
R101	22K 1W	
R102	1500Ω	
R103	1000Ω	

ITEM No.	RATING	REMARKS
R104	100K	
R105	22K 1W	
R106	12K	
R107	1000Ω	
R108	1500Ω	
R109	68Ω	
R110	82K	
R111	1meg	
R112	6800Ω	
R113	6800Ω	
R114	10K	
R115	1meg	
R116	12K	
R117	220K	
R118	1500Ω	
R119	100K	
R120	12K	

ITEM No.	RATING	REMARKS
R121	12K	
R122	100K	
R123	470K	
R124	220K	
R125	2700Ω	
R126	22K	
R127	470K	
R128	120Ω 2W	
R129	2.2Ω	
R130	2.2Ω	
R131	470Ω 7W	#RW-470-17
R132	470Ω 7W	#RW-470-17
R133	1600Ω 5W	#RW-1601-15
R134	68Ω	
R135	1meg	

Muntz Part Number.

Note 1. May not be used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MUNTZ PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L19	FM Ant. Coil	LC-0080	19-1000	19-1000	BC-561	4602	VP-9	1uh
L20	FM RF Coil	LC-0084						
L21	FM Osc. Coil	LC-8001						
L22	Cathode Choke	LC-9125	19-1000	19-1000	BC-561	4602	VP-9	1uh
L23	RF Choke		19-1003	19-1003	BC-564	4608		3.7uh
L24	1st FM IF Trans.	LI-8002	16-3487	16-3487	FM-254	1463		
L25	Loop Ant.	AN-0025						
L26	AM Osc. Coil	LO-8001	14-1073	14-1073	BC-393	69-OSC		
L27	1st AM IF Trans.	LI-8001	16-6758	16-6758	BC-352	12-C1	RF-1	
L28	2nd FM IF Trans.	LI-8002	16-3487	16-3487	FM-254	1463		
L29	2nd AM IF Trans.	LI-8001	16-6758	16-6758	BC-353	12-C2	RF-2	
L30	3rd FM IF Trans.	LI-8002	16-3487	16-3487	FM-254	1463		
L31	Ratio Det.	LO-8002	17-3498	17-3498	FM-255	1465		
L32	Fil. Choke	LC-0080	19-1000	19-1000	BC-561	4602	VP-9	1uh ①

① IRC Part #CLA.

RADIO PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L33	.085A	92Ω	2.45 Hy.	LC-0059-1	26C82	C-2974	F-805	C-2303	26C82	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T6	117V @ .55A	560VCT @ .085A	6.3V @ 4.2A	TP-8002	24R13 ①	P-3052 ①		PM8420	24R13 ①	R-110B ②

① Tape 5V winding.

② Tape 5V winding and C. T. on 6.3V winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T7	3500Ω	3-4Ω	TA-8004	26S50	A-3018	AU-604	A-3849	26S50	S-67X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MUNTZ PART No.	QUAM PART No.	
SP2	8"	PM	6-8Ω	SK-0023-3	8A21Z6.8	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MUNTZ PART No.	REPLACEMENT DATA
K1	AM Diode Filter	50mmf, 50mmf, 47K	CC-8001	Aerovox PA-99 Centralab PC-52 Cornell-Dubilier 111TM3 Sprague D-3

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MUNTZ PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M5	3AG	3A 250V P/T	FU-0004		318003 (3A 250V P/T)		GJV3	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							
	MUNTZ PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M6		13TB		26-S				8TA4-S	N-8TA-S

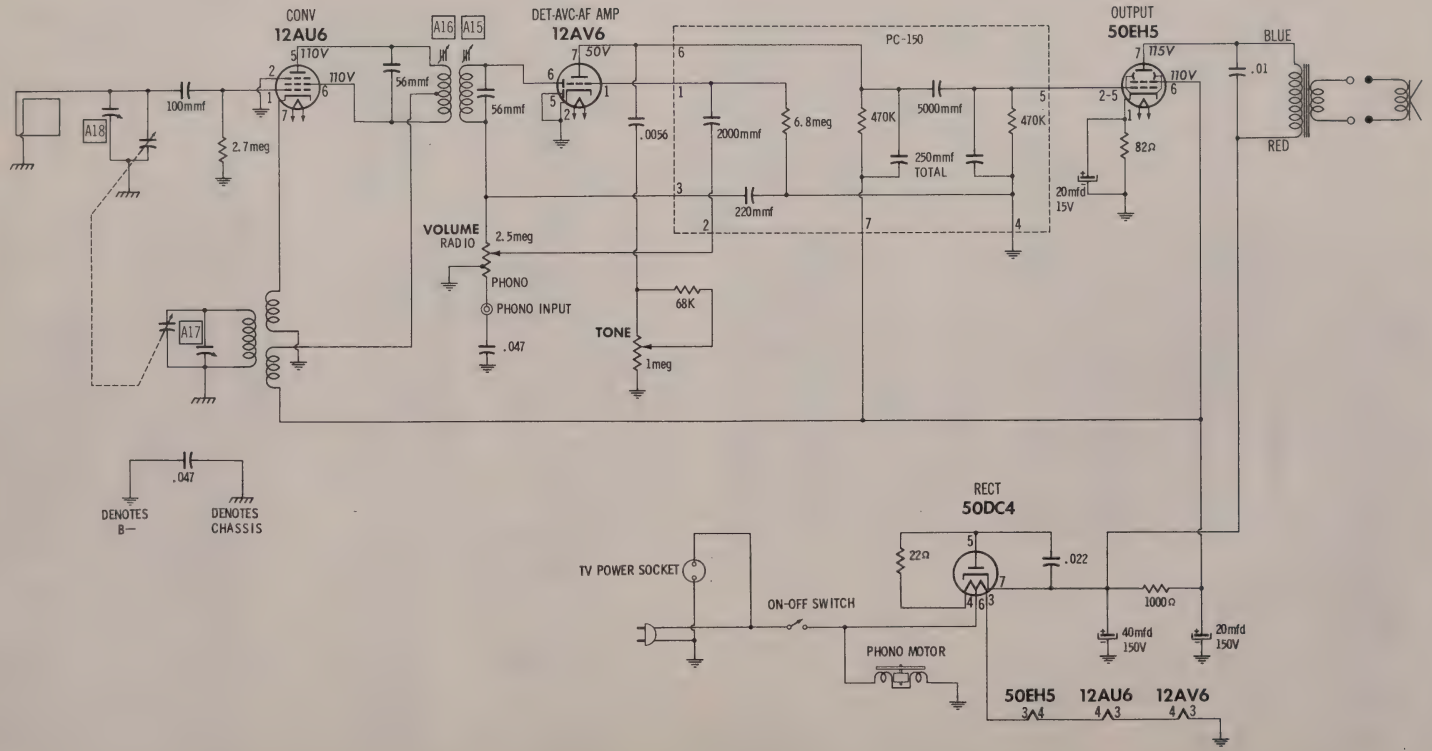
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	MUNTZ PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M7		W-103STSS * or W-103STDS †	S-69X * or S-69XSD † or S-69XDD ♦	* Dual Sapphire † Jewel & Diamond, Dual ♦ Diamond, Dual

MISCELLANEOUS

ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M8	Tuning Gang	CT-8007	FM AM 3 Gang (Ant. 15-331mmf, Osc. 11-108mmf)
M9	Switch	SW-8002	Function (Rotary, Wafer Type)



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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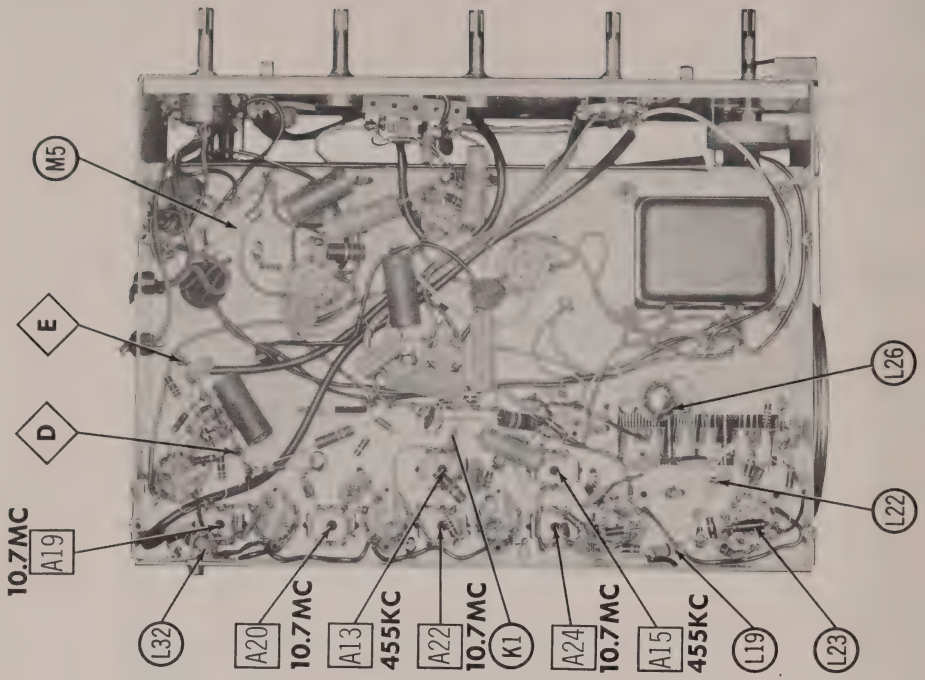
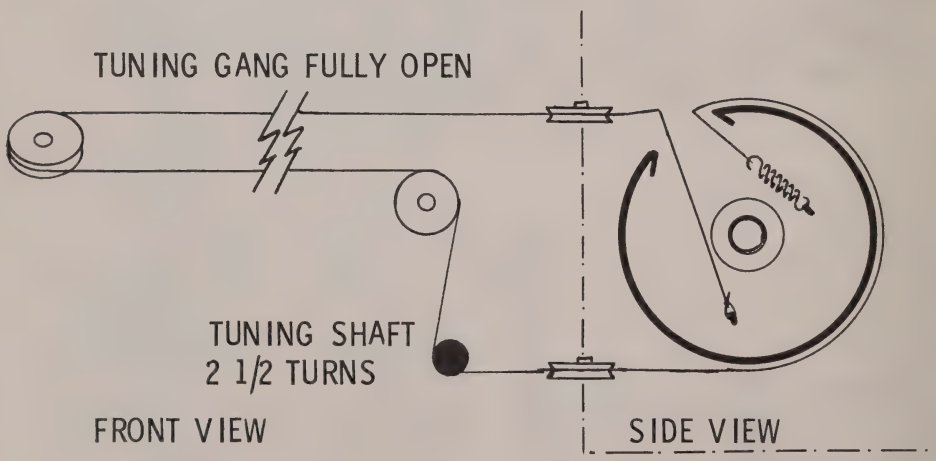
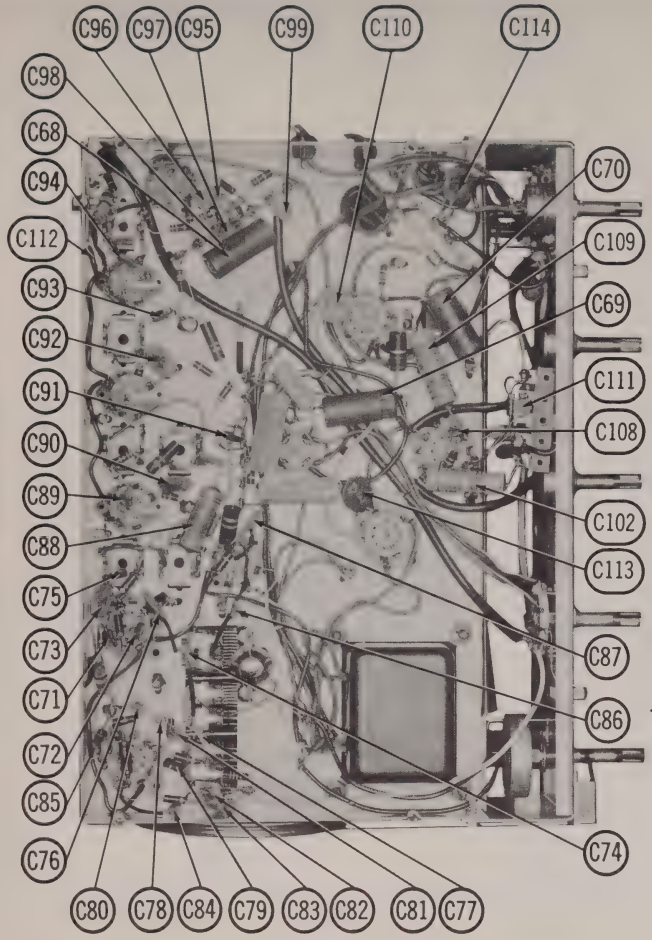
AM RADIO CHASSIS USED IN TV COMB. MODEL 21CP-1



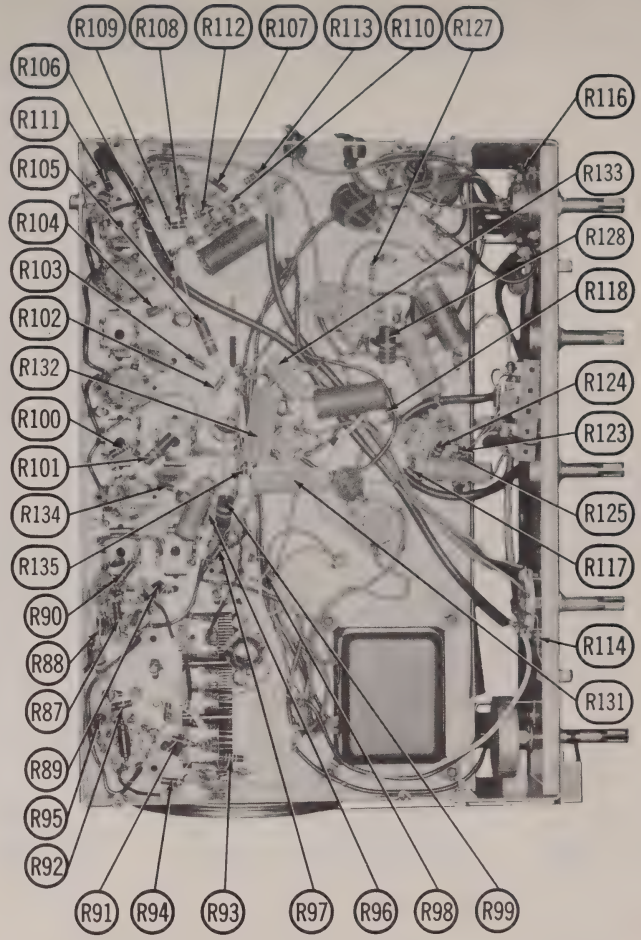
FM AM RADIO CHASSIS-BOTTOM VIEW
ALIGN., MISC., & INDUCTOR IDENT.



FM AM RADIO DIAL CORD STRINGING



FM-AM RADIO CHASSIS — BOTTOM VIEW
CAPACITOR IDENT.



FM-AM RADIO CHASSIS — BOTTOM VIEW
RESISTOR IDENT.

VHF TUNER PARTS LIST AND DESCRIPTIONS

PR–0300

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	2CY5	V202	Mixer - Osc.	5CG8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	4. 2							
C202	2. 2		NPO-DI 2. 2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C203	10 NPO 5%		NPO-DI 10	DTZ-10	C10Q1C		CNO-410	10TCC-Q10
C204	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C205	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C206	100 N3300 5%					*		
C207	10 N220 5%					*		10TCR-Q10
C208	10 N330 5%			TCA-10		*		10TCS-Q10
C209	10 N750 5%			TCN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10
C210	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C211	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C212	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C213	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C214	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C215	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C216	1000 10%		EF-001	MFT-1000		CCF-102	CT280A	
C217	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C218	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	22K	
R202	10K	
R203	22K	
R204	10K	
R205	220K	

ITEM No.	RATING	REMARKS
R206	5600Ω	
R207	150K	
R208	10K	
R209	15K	
R210	2200Ω	

ITEM No.	RATING	REMARKS
R211	10K	
R212	330K	
R213	330K	

TUNER ALIGNMENT INSTRUCTIONS

PR–0300

VHF OSCILLATOR ALIGNMENT

Suggested Alignment Tools: GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531

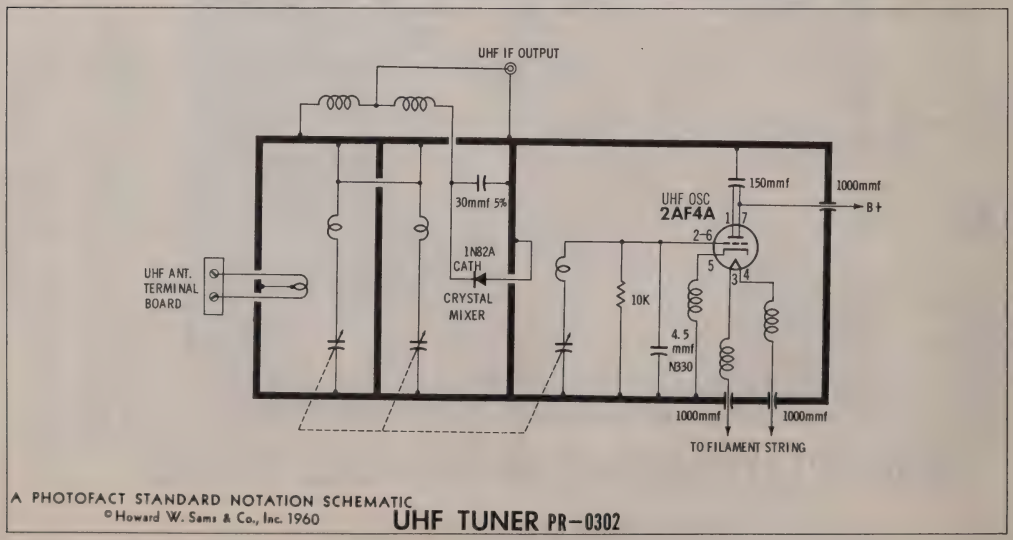
The individual channel adjustment screws are accessible one at a time, thru a hole in the front of the tuner, as the Channel Selector is rotated. Set the Fine Tuning to the center of its range and switch to channel to be adjusted and adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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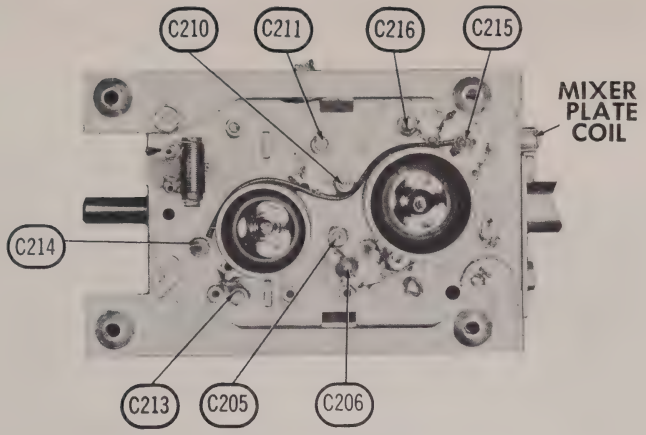
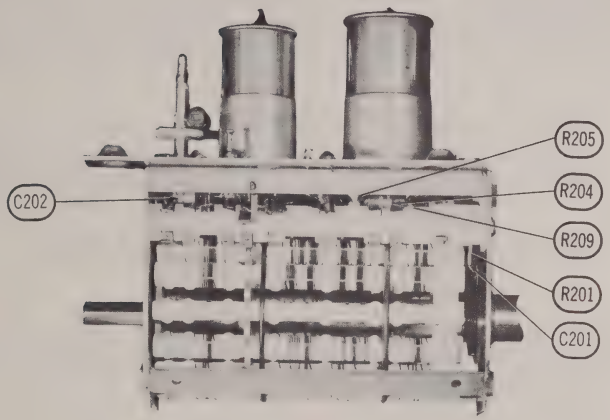
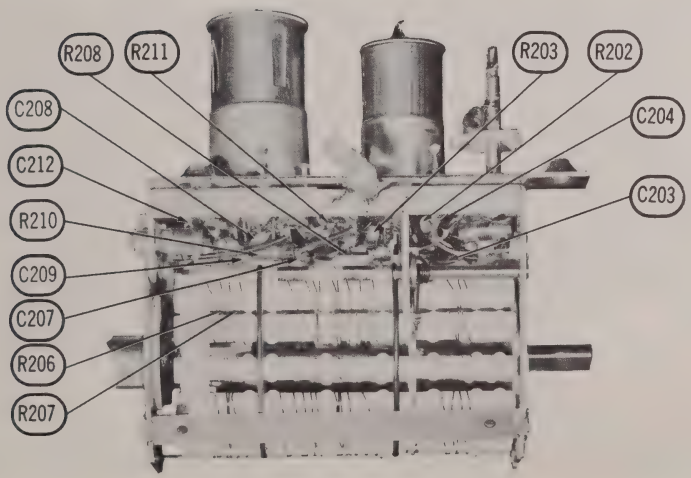
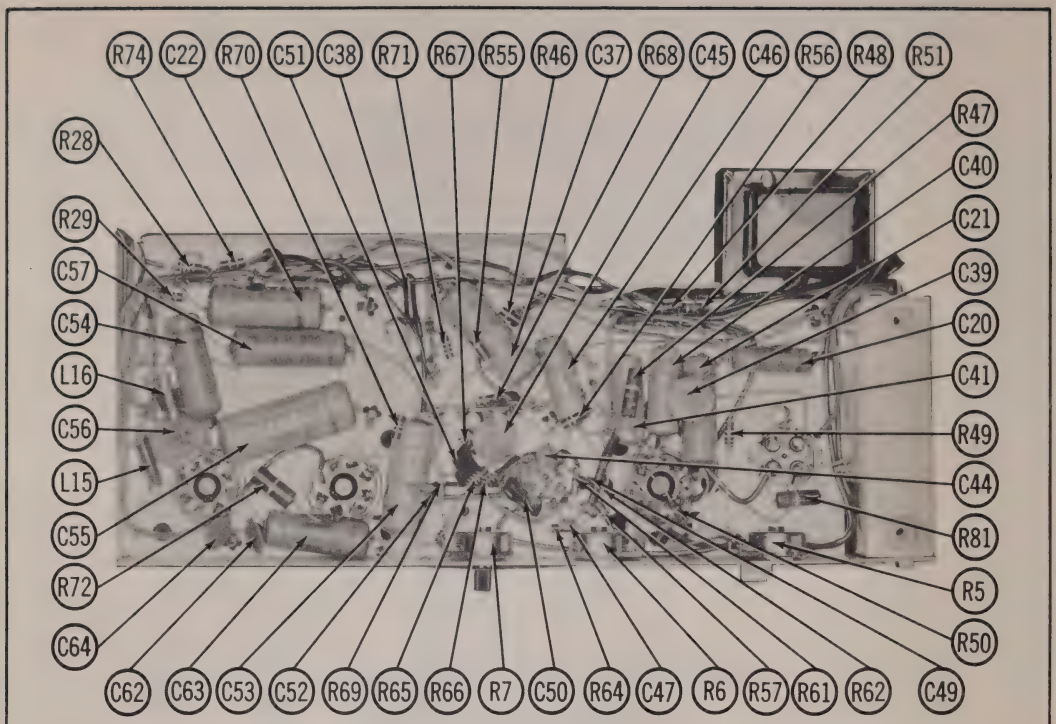
UHF TUNER PR–0302



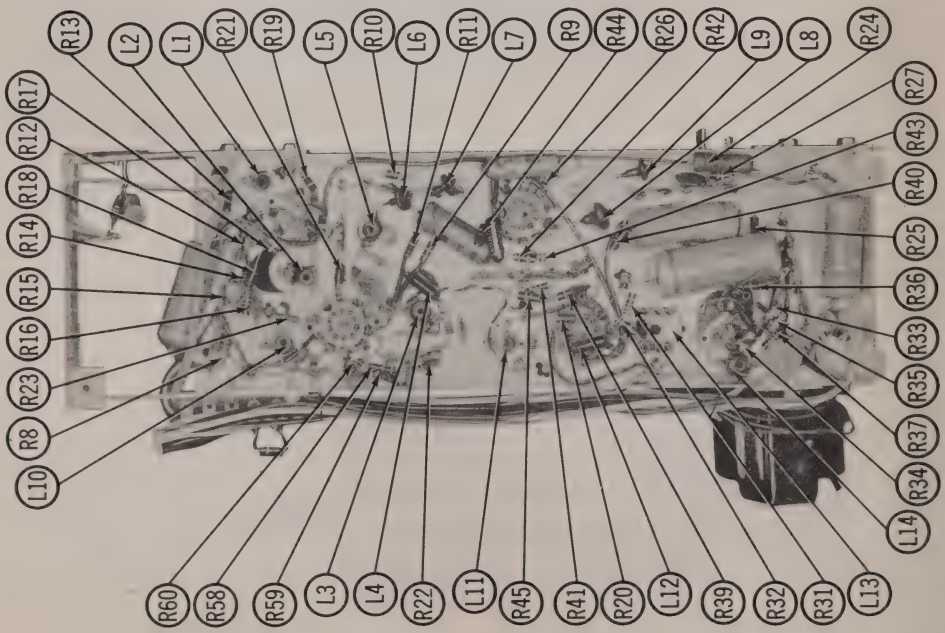




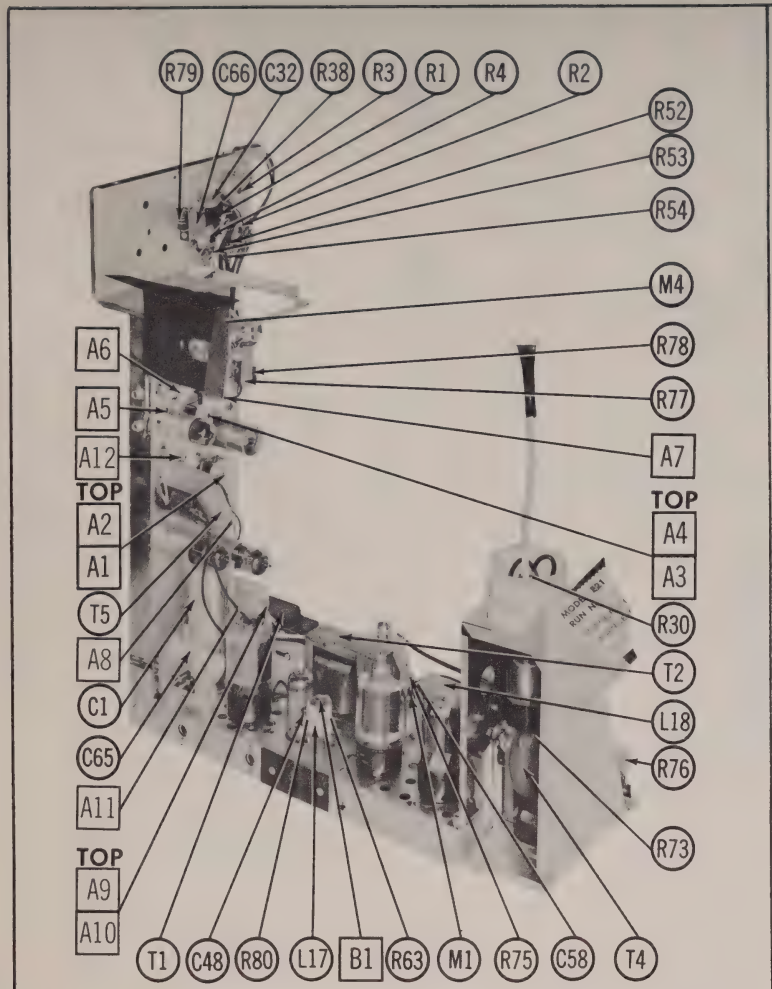
VHF TUNER PR-0300



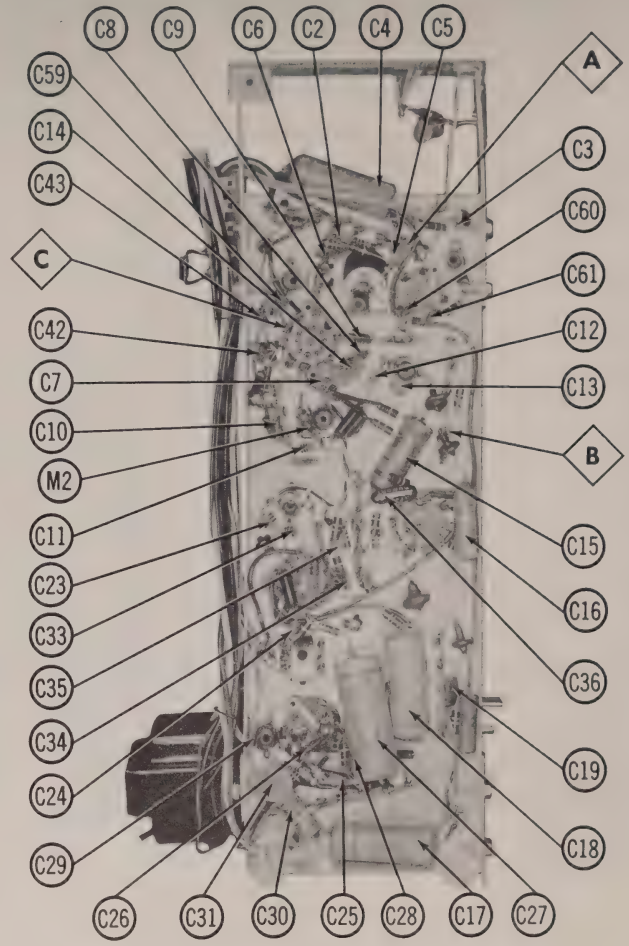
HORIZONTAL CHASSIS - BOTTOM VIEW



VERTICAL CHASSIS - BOTTOM VIEW
RESISTOR & INDUCTOR IDENT.



CHASSIS - REAR VIEW



VERTICAL CHASSIS-BOTTOM VIEW
ALIGNMENT & CAPACITOR IDENT.

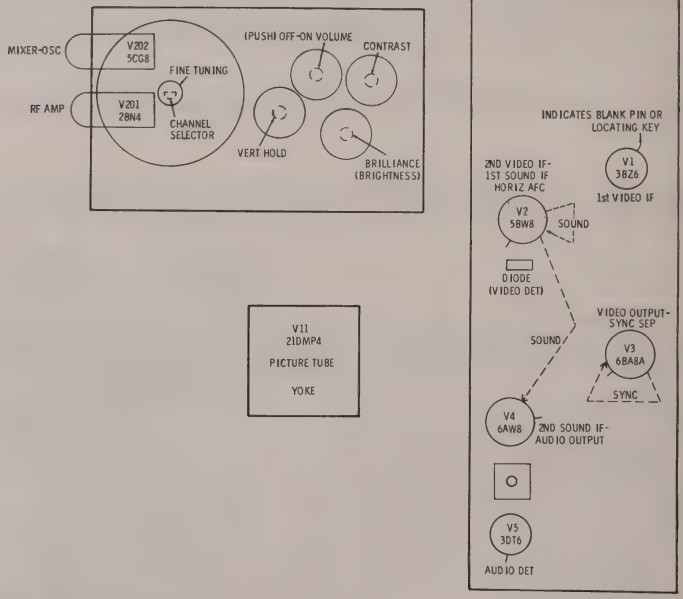
MUNTZ CHASSIS 13TL06, 13TL07,
13TL07U, 13T106, 13T107, 13T107U

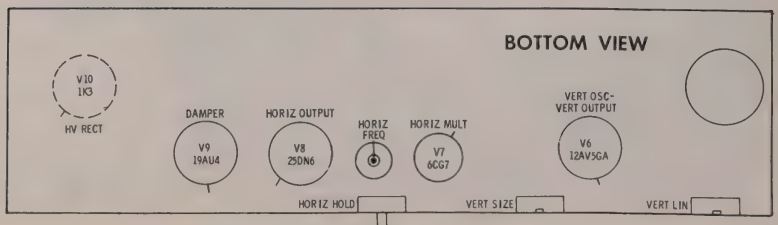
FOLDER 1

RESISTANCE MEASUREMENTS

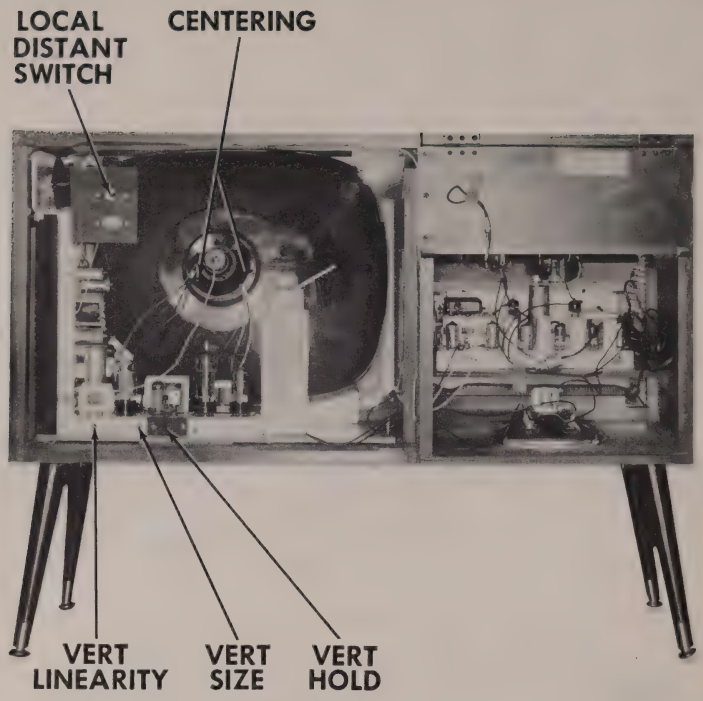
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	1.5meg § 1.9meg	47Ω	16.5Ω	16Ω	†1200Ω	†1200Ω	0Ω		
V2	5BW8	2200Ω	1meg	2meg	1.5Ω	0Ω	1500Ω	100Ω	†1500Ω	†1500Ω
V3	6BA8A	0Ω	1.8meg § 2.1meg	†24K	16.5Ω	18Ω	•75Ω	2.2meg	†10K	†3300Ω
V4	6AW8	0Ω	47K	†4700Ω	18Ω	18.5Ω	0Ω	27K	†136Ω	†270Ω
V5	3DT6	4.8Ω	560Ω	18.5Ω	19Ω	†270K	†39K	470K		
V6	12AV5GA	• 1.5meg	5.5Ω	0Ω	TP	†380Ω	NC	3Ω	†•70K	
V7	6CG7	†10K	3meg	1000Ω	19Ω	19.2Ω	†47K	•80K	1000Ω	0Ω
V8	25DN6	NC	20Ω	0Ω	NC	200K	NC	19.2Ω	†1200Ω	TOP CAP 11.5Ω
V9	19AU4	NC	NC	¶700K	NC	†25Ω	NC	20Ω	22Ω	
V10	1K3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †410Ω
V11	21DMP4	3Ω	10K	†160K	†16Ω	NC	NC	•190K	1.5Ω	
V201	2BN4	0Ω	1.3meg	16Ω	15.5Ω	†2000Ω	0Ω	1.3meg		
V202	5CG8	10K	†6600Ω	0Ω	14Ω	15.5Ω	2000Ω	†1000Ω	0Ω	320K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
§ VARIES WITH SETTING OF LOCAL-DISTANT SWITCH.
† MEASURED FROM 165V SOURCE. NC NO CONNECTION
‡ MEASURED FROM PIN 3 OF V9. TP TIE POINT





TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Allow the receiver a few minutes warm-up time.

Adjust controls for a normal picture.

Connect a clip lead across the Horizontal Frequency Coil (L16).

Connect a clip lead from point Ⓒ to chassis.

Adjust the Horizontal Hold Control (R7) until a single picture is attained.

Remove the short from L16. Adjust the Horizontal Frequency Slug (B1) with the slug entering the coil from the chassis side until a single picture is attained, then turn B1 1/4 turn clockwise for final setting of the slug.

Remove the clip lead from point Ⓒ and the picture should snap into sync.

Turn the Horizontal Hold Control fully clockwise, then turn slowly counterclockwise until the picture falls into sync. With this setting of the horizontal hold control, the picture should remain in sync regardless of the signal level.

Measure the DC voltage between pin 2 (grid) of Horiz. Mult. and chassis. It should measure 0 to .2 volts positive if circuit is operating properly.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 17PL

1. Remove channel selector knob.
2. Remove 8 metal screws holding rear cover. Remove rear cover.
3. Remove 4 metal screws (on bottom of cabinet) holding chassis.
4. Remove picture tube socket, hi voltage lead, speaker leads, ground wire from chassis and yoke.
5. Remove chassis.

PICTURE TUBE REMOVAL

1. It is necessary to remove the chassis for picture tube removal. (See "Chassis Removal".)
2. Remove 6 metal screws holding tube mounting.
3. Remove picture tube by pulling straight out.

TV CHASSIS REMOVAL MODEL 21CP-3

1. Remove 2 wood screws holding rear cover. Remove rear cover.
2. Remove 5 push-on type knobs. Remove 4 screws holding channel selector knob. Remove channel selector knob.
3. Remove screw just below channel selector knob.
4. Remove speaker leads, yoke, and hi voltage lead.
5. Remove 3 chassis bolts under bottom of cabinet and 1 nut holding picture tube bracket.
6. Pull chassis straight out.

PICTURE TUBE REMOVAL

1. It is necessary to remove the chassis for picture tube removal. (See "Chassis Removal".)
2. Loosen 2 nuts holding picture tube mounting.
3. Pull picture tube straight out.

PHOTOFACT® Folder

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

MODEL 921-SP-925B (CH. 1057-79)

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

MODEL 921-SP-925B (CH. 1057-79)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Trav-Ler Models 921-SP-925B, M, W Chassis 1053-69, 1057-79
MANUFACTURER	Trav-Ler Radio & Tele. Corp., 571 West Jackson Blvd., Chicago 6, Illinois
TYPE SET	Television Receiver (With stereo amp. and 4 speed automatic record changer)
TUBES	VHF - Seventeen
POWER SUPPLY	110-125 Volts AC, 60 Cycle
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #RC-38 SEE MONARCH CHANGER MODEL UA8 IN PHOTOFACT SET 381 FOLDER 1

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 3 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE DEVICE

A 5.6Ω fusible resistor (R104) is used for low voltage power supply protection. (For location, see "Chassis Top View".)

TUNER OSCILLATOR ADJUSTMENTS

To adjust VHF Oscillator, remove plug above tuner inside record changer compartment.

AGC

The AGC may be varied by means of an AGC control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by connecting the lead from pin 6 of the picture tube to various voltage points. (For location, see photo "Cabinet, Rear View".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by adjusting a metallic sleeve, located between the yoke and the picture tube neck, in or out of the yoke.

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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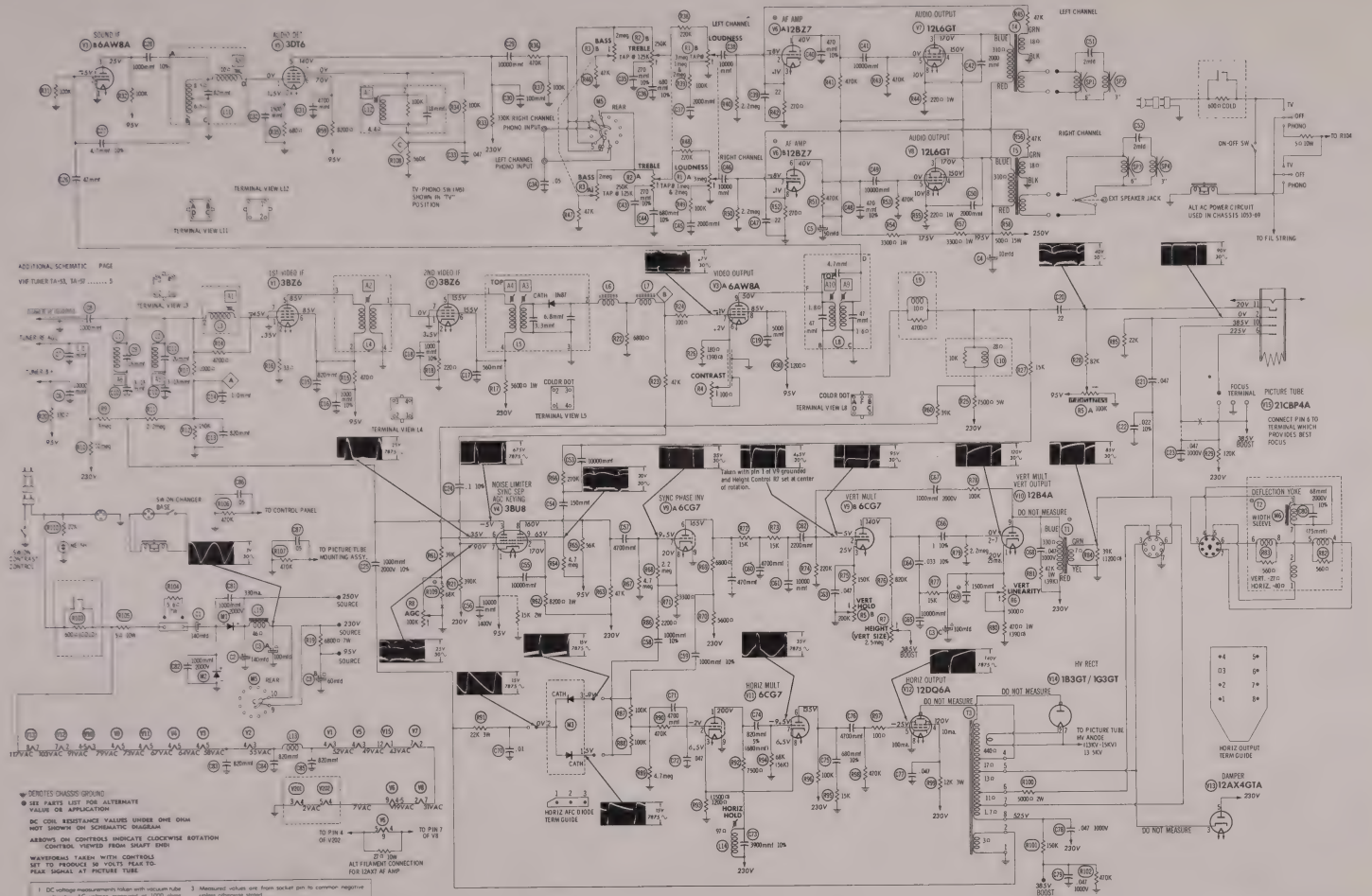
JC858

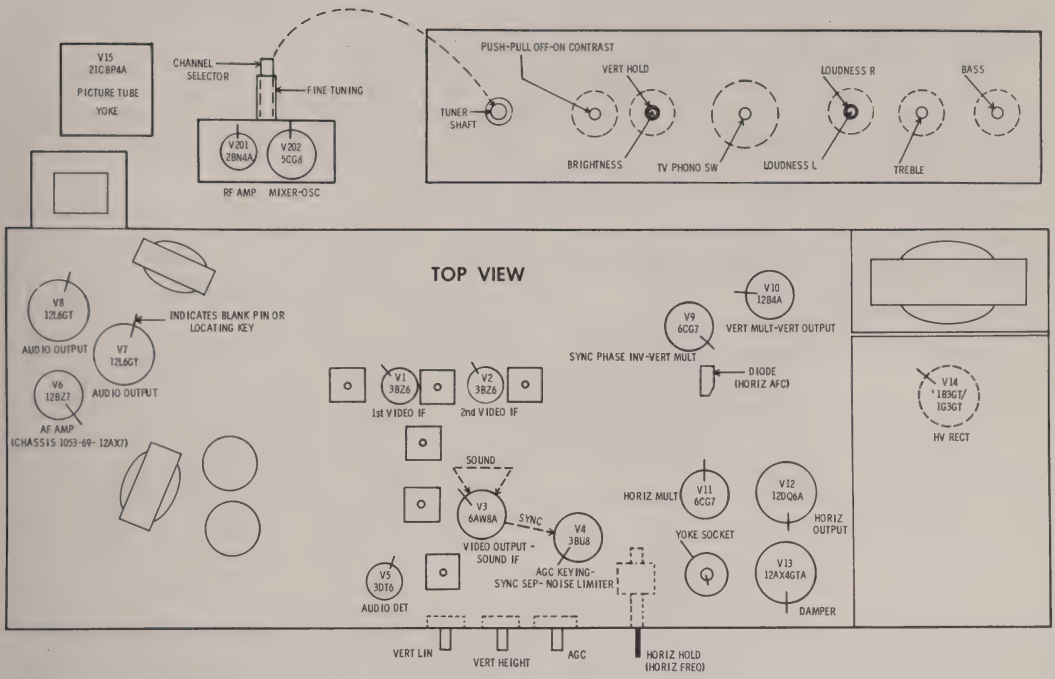
DATE 6-60 SET 490 FOLDER 2

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

SET 490 FOLDER 2


SOUND IF V1 6AW8A
AUDIO DET V2 3DT6
AF AMP V6 12BZ7
AUDIO OUTPUT V7 12L6GT
AF AMP V8 12BZ7
AUDIO OUTPUT V9 12L6GT
LEFT CHANNEL
RIGHT CHANNEL
BASS
TREBLE
LOUDNESS
LEFT CHANNEL PHONO INPUT
RIGHT CHANNEL PHONO INPUT
TV-PHONO SW (MB) SHOWN IN "TV" POSITION
ON-OFF SW
EXT SPEAKER JACK
ALT AC POWER CIRCUIT USED IN CHASSIS 1053-69
TO FIL STRING
TERMINAL VIEW L12
TERMINAL VIEW L11
1ST VIDEO IF V1 3BZ6
2ND VIDEO IF V2 3BZ6
VIDEO OUTPUT V4 6AW8A
CONTRAST
COLOR DOT
TERMINAL VIEW L5
TERMINAL VIEW L4
TERMINAL VIEW L8
PICTURE TUBE V15 21CBP4A
FOCUS
BRIGHTNESS
CONNECT PIN 6 TO TERMINAL WHICH PROVIDES BEST FOCUS
S-W CHANGER BASE
TO CONTROL PANEL
NOISE LIMITER SYNC SEP AGC KEYING V4 3BU8
SYNC PHASE INV V5 6CG7
VERT MULT V5 6CG7
VERT MULT VERT OUTPUT V10 12B4A
DO NOT MEASURE
DEFLECTION YOKE
WIDTH SLEEVE
VERT LINEARITY
VERT HOLD
HEIGHT (VERT SIZE)
TO PICTURE TUBE MOUNTING ASSY
250V SOURCE
230V SOURCE
95V SOURCE
AGC
HORIZ OUTPUT V12 12DQ6A
HV RECT V14 1B3GT/1G3GT
HORIZ MULT V11 6CG7
HORIZ AFC DIODE TERM GUIDE
HORIZ HOLD
TO PICTURE TUBE HV ANODE (19KV-15KV) 13 SKV
HORIZ OUTPUT TERM GUIDE
DAMPER V13 12AX4GTA
38.5V BOOST SOURCE
VERT - 270 HORIZ +80
ADDITIONAL SCHEMATIC PAGE
VHF TUNER TA-93, TA-97 5
DENOTES CHASSIS GROUND
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER OHM OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured on 1000 ohms per volt.
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
*Howard W Sams & Co, Inc. 1960
TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

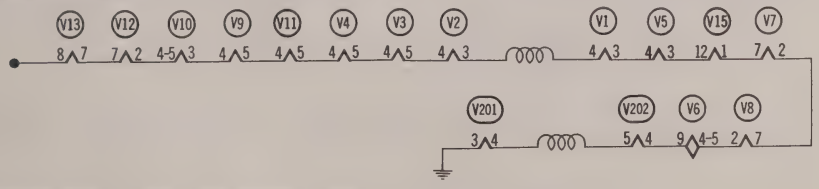
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor, Rectifiers (B+)

SWEEP FAILURE
No raster, has sound V11, V12, V13, V14, V15
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, Rectifiers (B+)
Vert. off freq. V9
Horiz. off freq. Diode (Horiz. AFC), V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (Video Det.), V3
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V3, V15
Has pic, no sound V3, V5, V6, V7 & V8
Overloaded picture V4

SYNC FAILURE
No vert. sync V4
No horiz. sync V4, (Diode) AFC
No vert. or horiz. sync V4

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SET 490 FOLDER 2

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

FOLDER 2

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO # 2531
A213 thru A215 .... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63MC	61.25MC 65.75MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

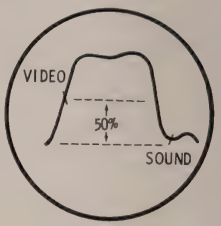


FIG. 201

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect the negative lead of a 4.5 volt bias supply to point ⓘ. Positive to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point ⓓ. Low side to chassis.	A213, A214, A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope. Reduce bias.
3.	"	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

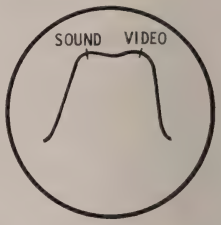
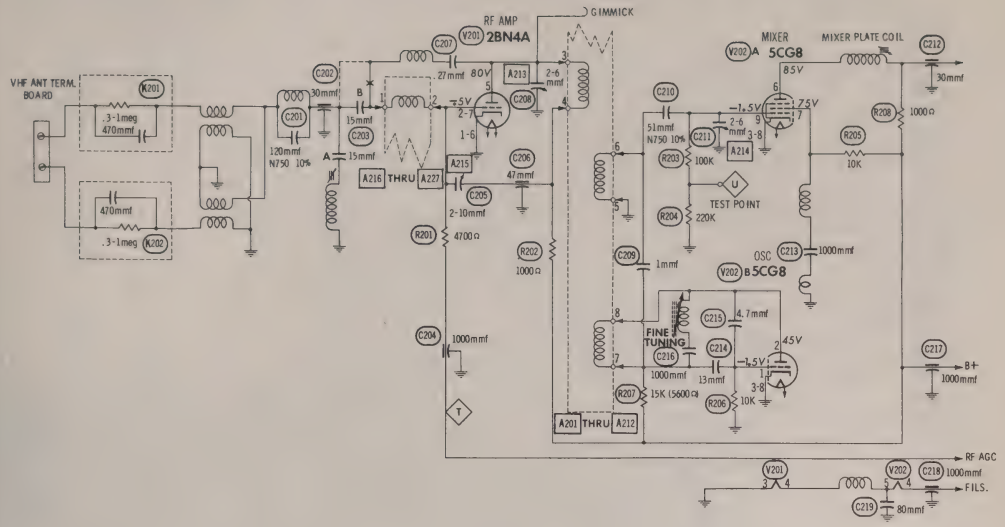


FIG. 202



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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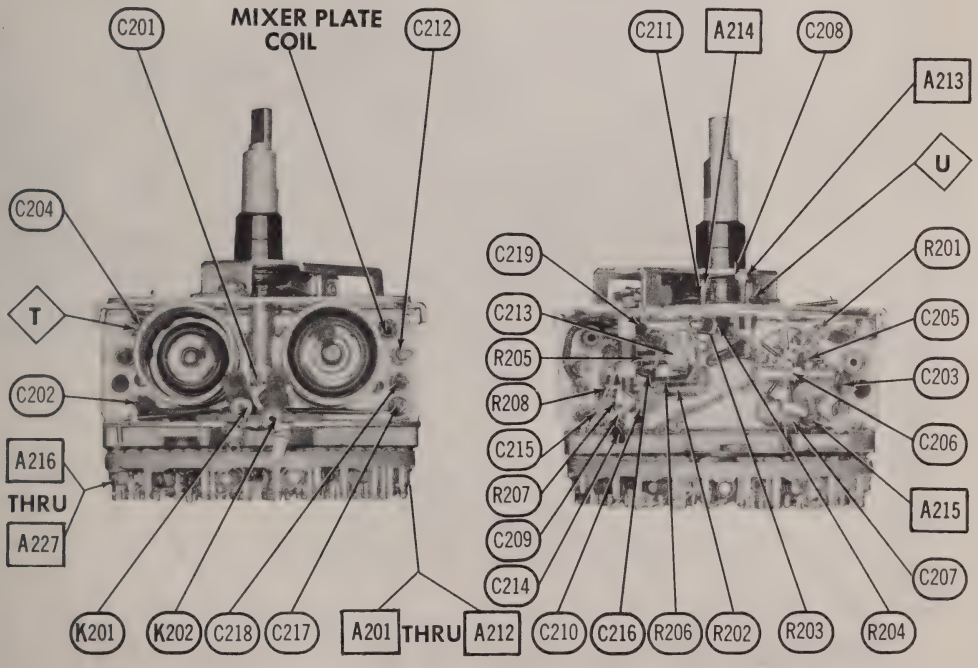
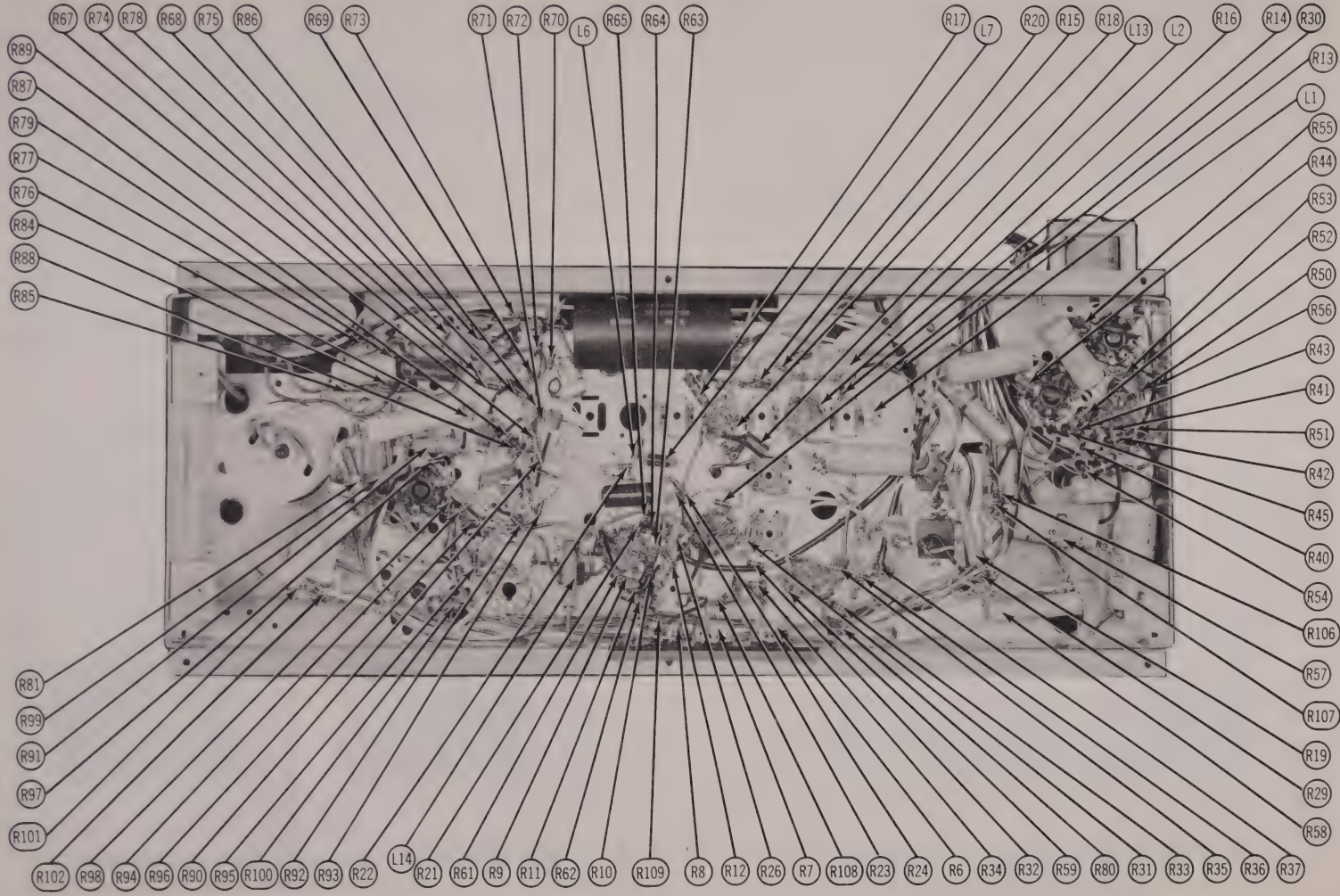
VHF TUNER TA-53 or TA-57

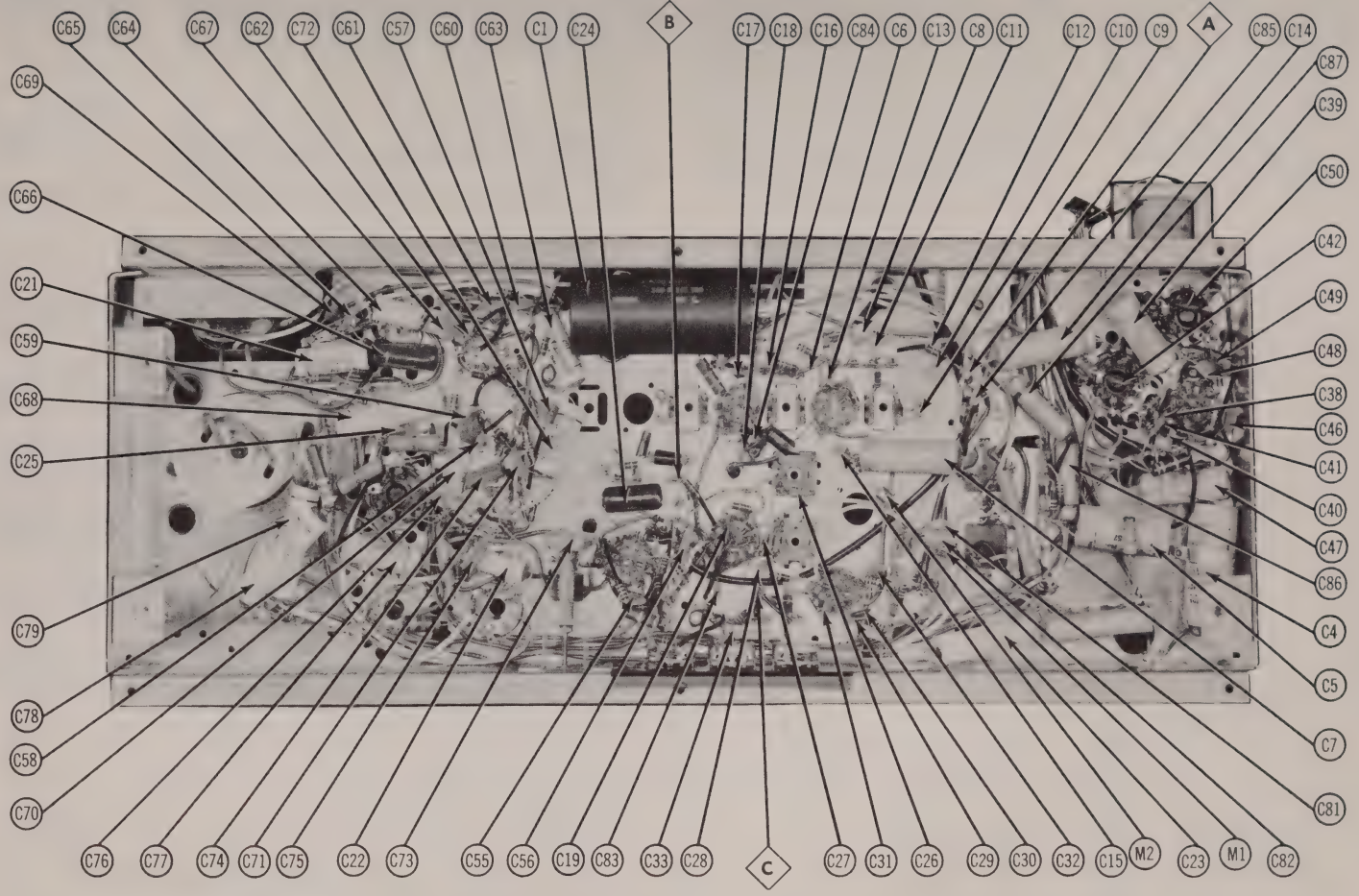


VHF TUNER TA-57

SET 490 FOLDER 2



TV CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.



TV CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.

TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	CBS / GENERAL ELECTRIC — USE	TYPE	ITEM No	RAYTHEON / SYLVANIA — USE	TYPE
V1	1st Video IF Amp.	3BZ8	V8	Audio Output	12L6GT
V2	2nd Video IF Amp.	3BZ8	V9	Sync Phase Inverter - Vert. Mult.	6CG7
V3	Video Output - Sound IF Amp.	6AW8A	V10	Vert. Mult. - Vert. Output	12H6A
V4	AGC Keying - Sync Sep. - Noise Limiter	3BU8	V11	Horiz. Mult.	6CG7
V5	Audio Det.	3DT6	V12	Horiz. Output	12DQ6A
V6	AF Amp.	12BZ7 Note 1	V13	Damper	1AX4GTA
V7	Audio Output	12L6GT	V14	HV Rect.	1B3GT/1G3GT

Note 1 Chassis 1053-69 uses 12AX7 in this application.

PICTURE TUBE

ITEM No	REPLACEMENT DATA: TRAV-LER PART No	GENERAL ELECTRIC PART No	RCA PART No	RAYTHEON PART No	SYLVANIA PART No	NOTES
V15	21CBP4A	21CBP4A 1	21CBP4-A 1	21CBP4 21CBP4A 1	21CBP4 21CBP4A 2	1 Aluminized 2 Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: TRAV-LER PART No	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	140	300	FC-64	AFHSL-37-25	XA0256	FP131	TMS-34	TVL-1540	
C2	140	300	FC-119	AFHSL-37-25	XA0255	FP131	TMS-42	TVL-1584	
C3A	100	300	FC-120	AFHS4-100-20	D0044	FP434.3	TMQ-159	TVL-4711	
B	60	300			RH1005				
C	100	50							
C4	50	300	FC-121	PRS680	BR5235	TC79	TD-50-450	TVA-1713	
C5	10	300	EC-57	PRS620	BR1045	TC62	TD-10-450	TVA-1504	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING		REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C8	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C7	1.0	100V		PSBBN-1.0		CUB2W1		GTM-2	2TM-M1
C8	1000			BPD-001	DD-102	BYA10DA	CCD-102	GP200	5HK-D10
C9	15			MPO-S 15	TCE-15	C10Q15C	CCTO-150	CND-415	10TCC-Q15
C10	3-13								
C11	30			MPO-S 30	TCE-30	C10Q30C	CCTO-300	CND-430	10TCC-Q30
C12	3-13								
C13	820			DE-820	DD-821	BYA10T82	CCD-821	GP382	10TS-T82
C14	1.0	100V		PSBBN-1.0		CUB2W1		GTM-2	2TM-M1
C15	820			DI-820		BYA10T82	CCD-821	GP382	10TS-T82
C16	1000	10%		DI-1000	DD-102	PM5DI	CCD-102	GP210	10TS-D10
C17	560			DE-560	DD-561	LQ07S6	CCD-561	GP356	10TS-T56
C18	1000	10%		DE-1000	DD-102	PM5DI	CCD-102	GP210	10TS-D10
C19	5000			BPD-005	DD-503	BYA10D5	CCD-502	GP250	5HK-D50
C20	22	400V		PSBBN-22		CUB4P2	4DP-S-224	GTM-4032	4TM-P22
C21	.047	400V		PSBBN-047	DD-503	CUB4S3	4DP-3-473	GTM-4147	4TM-S47
C22	.022	600V	10%			PM6S22	6DP-2-223	GEM-1612	6TM-S22
C23	.047	1000V				CUB3S47	1S1P-5-473	GEM-10147	10TM-S47
C24	.1	600V	10%			PM6C1P1	6DP-4-104		6TM-P1
C25	1000	3000V	10%	#CC-69					
C26	47			MPO-S 47	TCE-47	C10Q47C	CCTO-470	CND-447	10TCC-Q47
C27	4.7	10V		MPO-S 4.7	TCE-4.7	C10Y47C	CCTO-4S7	CND-547	10TCC-V47
C28	1000	10%		DI-1000	DD-102	1BS1DI	CCD-102	GP200	10TS-D10
C29	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C30	100			BPD-001	DD-101	LQ07S1	CCD-101	GP100	10TS-T10
C31	4700			BPD-0047	DD-472	BYA10D47M	CCD-472	GP347	5HK-D47
C32	1500			BPD-0015	DD-152	BYA10J5	CCD-152	GP214	5HK-D15
C33	.047	200V		PSBBN-047	DD-503	CUB2S47	4DP-3-473	GTM-4147	2TM-S47
C34	.68	400V		PSBBN-05	DD-503	CUB4S5	4DP-3-503	GTM-415	4TM-S5
C35	270	10%		DI-270	DD-271	LQ07S7	CCD-271	GP327	10TS-T27
C36	680	10%		DI-680	DD-681	LQ07S6	CCD-681	GP368	10TS-T68
C37	1000			BPD-002	DD-302	BYA10D2	CCD-302	GP230	5HK-D30
C38	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C39	22	200V		PSBBN-22		CUB2P22	2DP-3-223	GTM-3032	2TM-P22
C40	470	10%		DI-470	DD-471	5RS7S7	CCD-471	GP347	10TS-T47
C41	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C42	3000			BPD-002	DD-302	BYA10D2	CCD-302	GP230	5HK-D30
C43	270	10%		DI-270	DD-271	LQ07S7	CCD-271	GP327	10TS-T27
C44	680	10%		DI-680	DD-681	LQ07S6	CCD-681	GP368	10TS-T68
C45	3000			BPD-002	DD-302	BYA10D2	CCD-302	GP230	5HK-D30
C46	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C47	22	100V		PSBBN-22		CUB1P22	1DP-3-223	GTM-3032	2TM-P22
C48	470	10%		DI-470	DD-471	5RS7S7	CCD-471	GP347	10TS-T47
C49	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C50	3000			BPD-002	DD-302	BYA10D2	CCD-302	GP230	5HK-D30
C51	Build 50V		#PC-19	PLBZBN-2.0		MPZW3		1UZ2050323	
C52	Build 50V		#PC-19	PLBZBN-2.0		MPZW3		1UZ2050323	
C53	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C54	150			DI-150	DD-151	LQ07S	CCD-151	GP315	10TS-T15
C55	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C56	10000	1400V		DAC-27	DD6S-103	5VE10E	16DP-3-103	GP-1	DAC-10
C57	4700			BPD-0047	DD-472	BYA10D47M	CCD-472	GP347	5HK-D47
C58	1000	10%		DI-1000	DD-102	1BS2DI	CCD-102	GP210	10TS-D10
C59	1000	10%		DI-1000	DD-102	1BS1DI	CCD-102	GP200	10TS-D10
C60	4700			BPD-0047	DD-472	BYA10D47M	CCD-472	GP347	5HK-D47
C61	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C62	.047	600V		BPD-0022	DD-223	BYA10D223	CCD-223	GP222	5HK-D223
C63	.047	600V		PS6SN-047	DD-503	CUB6S47	6DP-3-473	GEM-4147	6TM-S47
C64	.033	600V	10%	VS4CS33-10%		PM6S33	6DP-3-333	GEM-1633	6TM-S33
C65	10000			BPD-01	DD-103	BYA10H	CCD-103	GP110	5HK-S10
C66	.1	600V	10%	VS4CS1P1-10%		PM6S1P1	6DP-4-104		6TM-P1
C67	1000	2000V		BYD-102	DD30-102	5VE10DE	3CCD-102	2ET-Z10	5YL-D10
C68	.047	1000V		PS6SN-047		CUB1S47	1SDP-5-473	GEM-10147	10TM-S47
C69	1500		Note 1	BPD-0015	DD-152	BYA10E15	CCD-152	GP215	5HK-D15
C70	68	600V		PS6SN-68	DE-102	CUB6S8	6DP-4-104	GEM-161	6TM-S8
C71	4700			BPD-0047	DD-472	BYA10D47M	CCD-472	GP347	5HK-D47
C72	.047	600V		PS6SN-047	DD-503	CUB6S47	6DP-3-473	GEM-4147	6TM-S47

PARTS LIST AND DESCRIPTIONS

FIXED CAPACITORS (cont)

ITEM No	RATING		REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C73	3900	10%				1S5DS9	CM-30E-392K	MCM2452.5	MS-339
C74	620	5%	(680mmf) †	1469-00082		1R5T62	CM-1ED-621J		MS-382
C75	680	10%		1469-00068		1R5T68	CM-1ED-681K	MCM349	MS-368
C76	4700			P188N-047	DD-472	BYA10D47M	CCD-472	GP347	5HK-D47
C77	.047	600V		P188N-047	DD-503	CUB3S47	6DP-3-473	GEM-6147	6TM-S47
C78	.047	1000V		P108BN-047		CUB1S47	1SDP-5-473	GEM-10147	10TM-S47
C79	.047	1000V		P108BN-047		CUB1S47	1SDP-5-473	GEM-10147	10TM-S47
C80	68	2000V	10% (75mmf) †			HVA30Q68		2DY-468	
C81	1000	2000V		HVD-30-1000	DD30-102	HVB20DE	3CCD-102	2HY-Z10	BL-D10
C82	1000	3000V		HVD-30-1000	DD30-102	HVB30DE	3CCD-103	3HY-Z10	BL-D10
C83	820			DF-820	DD-821	BYA10T82	CCD-821	GP382	10TS-T82
C84	820			DH-820	DD-821	BYA10T82	CCD-821	GP382	10TS-T82
C85	820			DJ-820	DD-821	BYA10T82	CCD-821	GP382	10TS-T82
C86	05	400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C87	.05	400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-D6

Note 1. May not be used in some versions.
Trav-Ler Part Number.

† Alternate Value.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: TRAV-LER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS—IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3 meg *		VC-190					Loudness, Right Channel
B	3 meg *							Loudness, Left Channel
R2A	250K		VC-188				FA254T1253	Treble, Right Channel
	125K Tap							
B	250K						RU254T1253	Treble, Left Channel
	125K Tap							
C	Shaft						CS8500	
R3A	2meg		VC-189	B-75	ADA7-2meg-S		FA36L	Bass, Right Channel
B	2meg			SR-75	Not Reg.		RU36L	Bass, Left Channel
C	Shaft			Not Reg.	FS-3		CS8500	
R4A	1000Ω		VC-200			H17-108	PP13R	Contrast Note 1
B	Shaft					SK7		
C	Switch					Not Reg.		Push-Pull, Off-On
R5A	100K		VC-176	F1-31		† GJ-1112	■ UE4047	Brightness
B	200K			B2-32				Vert. Hold
R6A	5000Ω		VC-85	ES-10	B47-5000-S	B11-114	SU-14	Vert. Linearity
B	Shaft			Not Reg.	Not Reg.	TM4	Not Reg.	
R7A	1. 2meg		VC-78	BX-63	B47-2.2meg-S	B11-219	SU-565	Height (Vert. Size)
B	Shaft			Not Reg.	Not Reg.	TM4	Not Reg.	
R8A	1meg		VC-84	BX-40	B47-100K-S	B11-128	PTA1L	AGC
B	Shaft			Not Reg.	Not Reg.	TM4	Not Reg.	

■ "ITA-LOC" Equivalent: FC15L, RU35L, OF12S, 123625
† "Concentrikit" Equivalent: K-2 Kit with base elements and shafts: B11-125, F1-204 (Panel)
(Not available as a factory assembled unit.) B11-139, R1-230 (Rear)
Note 1: Chassis 1053-69 uses 1000Ω Contrast (Part #VC-178).
* Tape ⅓meg and 2meg.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R9	3meg	
R10	10meg	
R11	2. 2meg	
R12	150K	
R13	1000Ω	
R14	4700Ω	
R15	470Ω	
R16	33Ω	
R17	5600Ω 1W	
R18	220Ω	
R19	6800Ω 7W	#RS288
R20	330Ω	
R21	390K	
R22	6800Ω	
R23	47K	
R24	100Ω	
R25	7500Ω 3W	#RS287
R26	150Ω	(390Ω) *
R27	15K	
R28	82K	
R29	130K	
R30	1300Ω	
R31	100K	
R32	100K	
R33	330K	
R34	100K	
R35	680Ω	
R36	470K	
R37	100K	
R38	220K	
R39	100K	
R40	2. 2meg	
R41	470K	
R42	270Ω	
R43	470K	
R44	220Ω 1W	
R45	47K	
R46	47K	
R47	47K	
R48	220K	
R49	100K	
R50	2. 2meg	
R51	470K	
R52	270Ω	
R53	470K	
R54	3300Ω 1W	
R55	220Ω 1W	
R56	47K	
R57	3300Ω 1W	
R58	500Ω 15W	#WH-54
R59	820Ω	
R60	39K	
R61	39K	
R62	3300Ω 1W	
R63	47K	
R64	4. 7meg	
R65	56K	
R66	270K	
R67	4. 7meg	
R68	2. 2meg	
R69	6800Ω	
R70	9600Ω	
R71	3300Ω	
R72	15K	
R73	15K	
R74	330K	
R75	150K	
R76	820K	
R77	15K	
R78	100K	
R79	2. 2meg	
R80	470Ω 1W	(390Ω) *
R81	47K 1W	(39K) *
R83	560Ω	
R83	560Ω	
R84	39K	(1900Ω) *
R85	22K	
R86	2200Ω	
R87	100K	
R88	100K	
R89	4. 7meg	
R90	470K	
R91	22K 3W	#IR276
R92	7500Ω	
R93	1200Ω	(1500Ω) *
R94	68K	(56K) *
R95	15K	
R96	100K	
R97	100Ω	
R98	470K	
R99	12K 3W	#IR275
R100	5000Ω 3W	(4700Ω) *
R101	150K	
R102	470K	
R103	100Ω (Cold)	#F-9
R104	5. 6Ω 7W	#F-8-1
R105	5Ω 10W	#WR-51
R106	470K	
R107	470K	
R108	560K	
R109	68K	Note 1
R110	22K	

* Alternate Value. # Trav-Ler Part Number. Note 1 Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	47. 25MC Trap Coil	L-161	"	"				1. 3uh
L3	41. 25MC Trap Coil	L-161-1	"	"				1. 3uh
L5	1st Video IF	L-150				6231 †		
L4	2nd Video IF	L-151	17-5004	17-5004	TV-125	6234		
L5	3rd Video IF	L-152						Ass'y.
L6	RF Choke	L-160	10-1005	10-1005	BC-566	4612		10. 4uh
L7	RF Choke	L-158	"	"				27. 5uh
L8A	4. 5MC Trap	L-154						
B	1st Sound IF	L-155	"	"				

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L9	Series Peaking Coil	L-162						① ②
L10	Shunt Peaking Coil	L-163						
L11	2nd Sound IF	L-167						
L12	Quadrature Coil	L-110A		17-1031 a 19-1001	17-1031 a 19-1001	BC-562	1481 a 4604	SD-5 a 1. 5uh
L13	Fil. Choke							

① Wound on 4700Ω Resistor.
② Wound on 10K Resistor.
† Divergard Secondary.
a Parallel with 100K Resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L14	97Ω		L-156	HS-5 †	TV-183 †	6210 †	H-102 †	HS-5 †	Horiz. Stabilizer † Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ⁄⁄	REPLACEMENT DATA: TRAV-LER PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
L15	.230A	46Ω	1.1 Hy.	FC-5	26C44	C-2994	F-801	C-2343	26C44	C-34X

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	Vert. Output	TR-36B	26S53	A-2823	V30T	V034	A-8143	26S53	A-108X
	Alt. Vert. Output	TR-36	26S53	A-2825	V30T	V034	A-8133	26S53	A-108X
T2	Yoke-Horiz. (WMH) (90)-Vert. (39MH)	L-118D	Y-16 ①②	MDF-92 ①②	Y90F19/43 ①②	PCM3046 ①②	DY-16A ①②	Y-16 ①②	Y-41 & NW-3 ②
	Alt. Yoke	L-118C	Y-16 ①②	MDF-92 ①②	Y90F19/43 ①②	PCM3046 ①②	DY-16A ①②	Y-16 ①②	Y-41 & NW-3 ②
	Rear Cover and Centering Device	TR-53	FLY-76 *	HVO-54 *	X129 *	EFR172 *	A-8255 *	FLY-76 *	YC-1 & CL-1 D-151R *
T3	Horiz. Output								

① Use original rear cover and centering device. Use original horiz. yoke damping network if necessary.
③ Add fifth lead to yoke and connect same as original.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	9500Ω	3-4Ω SEC. 2 170Ω	AT-47							
	PRI.	SEC. 1								
T5	9500Ω	3-4Ω SEC. 2 170Ω	AT-47							

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: TRAV-LER PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3-4Ω	SPK-62	6A3I	
SP2	3"	PM	4-6Ω	SPK-28	3A1ST24. 7	
SP3	6"	PM	3-4Ω	SPK-62	6A3I	
SP4	3"	PM	4-8Ω	SPK-28	3A1ST24. 7	

RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: TRAV-LER PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.330A	SR-14 *	52A *	HF506 *	40K *	SR500 *	* Silicon
M2	.330A	SR-14 *	52A *	HF504 *	40K *	SR500 *	◆ Dual Selenium Diods
M3		SR-15 ◆	SD-91 * †	K1615 ◆			† Two required

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	5	5	5	5	5	5	5
5	4	4	4	4	4	4	4
6	N. C. See Note ③	N. C. See Note ①	N. C. See Note ①	N. C. See Note ③	N. C. See Note ③	N. C. See Note ③	3
7	2	2	2	2	2	2	7
8	1	1	1	1	1	1	8
2	7	7	7	7	7	7	2
1	8	8	8	8	8	8	1
Special Notes	② ③	② ④	② ③	② ③	③ ④	③ ③	

③ Remove Resistor R100, Capacitor C80, and Yoke Center Tap Lead from circuit. Requires new damping network consisting of 150Ω, ½ watt Resistor and 82mmf @ 2KV Capacitor connected in series. Install damping network across horiz. yoke terminals #3 and #7.
④ Remove one turn from filament winding.

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M4	Tuner	TA-57	VHF, Ch. 1057-79
	Tuner	TA-53	VHF, Ch. 1053-69
M5	Switch	SW-40	TV-Phono, Model 921SP925
	Switch	SW-38	TV-Phono, Model 921SP925 (Revised)
M6	Magnet	IM-299	Width Device

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA								
	TRAV-LER PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M7		76-TS-TB		96					

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	TRAV-LER PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M8	(78RPM) LP		CRA-57 * or CRA-57D ♦ or CRA-57X † or CRA-57XD † ♦	† Jewel ♦ Diamond * Metal

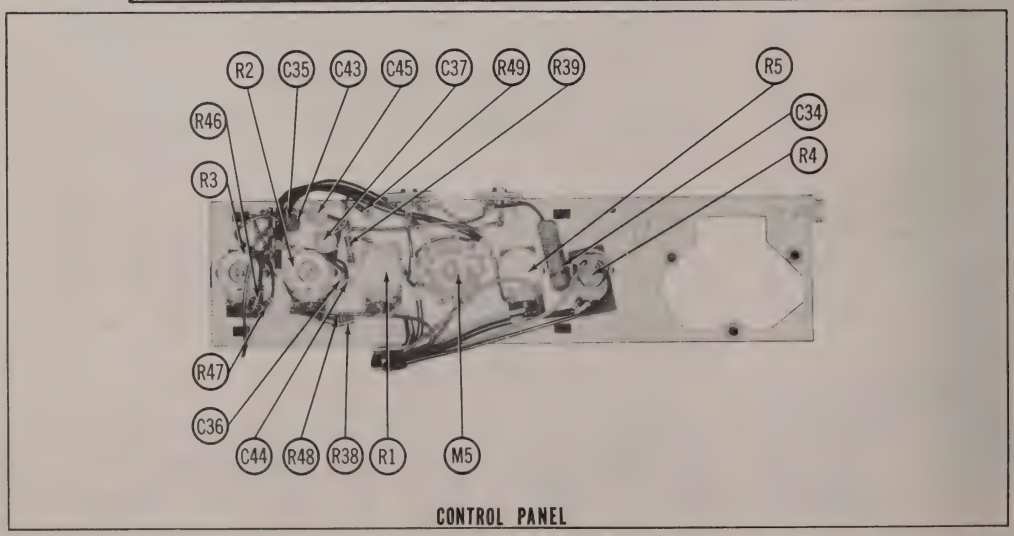
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	FW-7	
Mask	MP-142	
Knob	K-364	Channel Selector
Knob	K-337	Fine Tuning
Knob	K-346	Loudness, Vertical Hold
Knob	K-338W	Loudness, Brightness (White)
Knob	K-347	Contrast, Treble, Bass
Knob	K-366	TV-Phono Switch
Cabinet	CA-343	
Cabinet Leg	CH-89	

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



CONTROL PANEL

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A1 thru A4, A7 thru A10 ... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A6 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
Mixer Plate Coil ..... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547

VIDEO IF ALIGNMENT

Set Contrast fully clockwise and AGC fully counterclockwise.
Connect the negative lead of a 3 volt bias supply to point Ⓐ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.0MC (10MC Swp)	41.25MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. (Across Video Det. load)	A1, A2, A3, A4, & Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Adjust Mixer Plate Coil and A2 to place 45.75MC marker at 50% on curve, A1 to correct low frequency side of curve, A3 for MINIMUM dip and A4 for proper tilt.
2.	"	"	"	41.25MC 47.25MC	"	"	A5, A6	Adjust A5 to place 41.25MC marker in proper trap notch. Adjust A6 to place 47.25MC marker in other trap notch.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.05mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (15KC Swp)	Any non-interfering channel	Across voice coil. Connect DC probe of VTVM to point Ⓒ. Common to chassis.	A7	Use high signal input. Set Volume for audible level. Adjust A7 for maximum audio on scope. If two peaks occur, select the one giving the highest meter reading.
4.	"	"	"	"	"	A8, A9	Reduce the signal level to the point where the audio on the scope starts to break up. Adjust A8 and A9 for cleanest maximum audio output on scope. Reduce the signal level still farther. Retouch A8 and A9 for cleanest maximum audio on scope.

SOUND IF ALIGNMENT USING AIR SIGNAL AND VTVM

Set the Contrast fully clockwise and tune in an air signal.
Connect the positive lead of the VTVM to point Ⓒ, negative lead to chassis.
Preset A7 fully counterclockwise. Next, turn A7 clockwise until a peak is obtained on the meter. The point of maximum undistorted sound as judged by listening, will occur slightly past this peak and will be between 2.5 and 3.5 volts on the meter. Tune A7 for maximum undistorted sound and not peak voltage.
Reduce the signal by disconnecting the antenna or detuning the Fine Tuning until the sound is distorted. Adjust A8 and A9 for maximum undistorted sound. Further reduce the sound and retouch A8 and A9. Continue reducing the signal and retouching A8 and A9 until optimum results are obtained. It may be necessary in some cases to retouch A7 for MINIMUM buzz at strong signal levels and A9 for cleanest sound at weak signal levels.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.05mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru diode det. (Fig. 2) to pin 7 (cathode) of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.

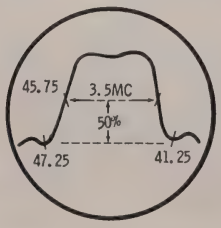


FIG. 1

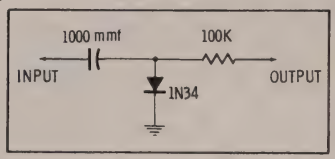


FIG. 2

TUNER PARTS LIST AND DESCRIPTIONS

TA-57

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	2BN4A	V202	Mixer-Osc.	5CG8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	120 N750 10%			TCN-120	C10T12U	CCTN-121	CN7-312	10TCU-T12
C202	30							
C203A	15		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
B	15		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C204	1000		EF-001	MFT-1000		CCF-102	CT280A	
C205	2-10			829-10				
C206	47							
C207	.27							
C208	2-6			829-6		VC-3	CT552	
C209	1		NPO-DI 1.0	TCZ-1			CNO-510	10TCC-V10
C210	51 N750 10%		N750-DI 47	TCN-51	C10Q51U		CN7-447	10TCU-Q47
C211	2-6			829-6		VC-3	CT552	
C212	30							
C213	1000		DI-1000	DD-102	BYA10DI	CCD-102	GP210	10TS-D10
C214	13		DI-12	TCZ-12	C10Q13C	CCTO-120	CNO-412	10TCC-Q12
C215	4.7		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C216	1000		DI-1000	DD-102	BYA10DI	CCD-102	GP210	10TS-D10
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	800		BPD-0008	DD-801	BYA10DI	CCD-102	GP382	10TS-D10

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART No.	REPLACEMENT DATA	
K201	Antenna Filter	470mmf, .3-1meg		Centralab	RC-471
				Sprague	AC1-1
K202	Antenna Filter	470mmf, .3-1meg		Centralab	RC-471
				Sprague	AC1-1

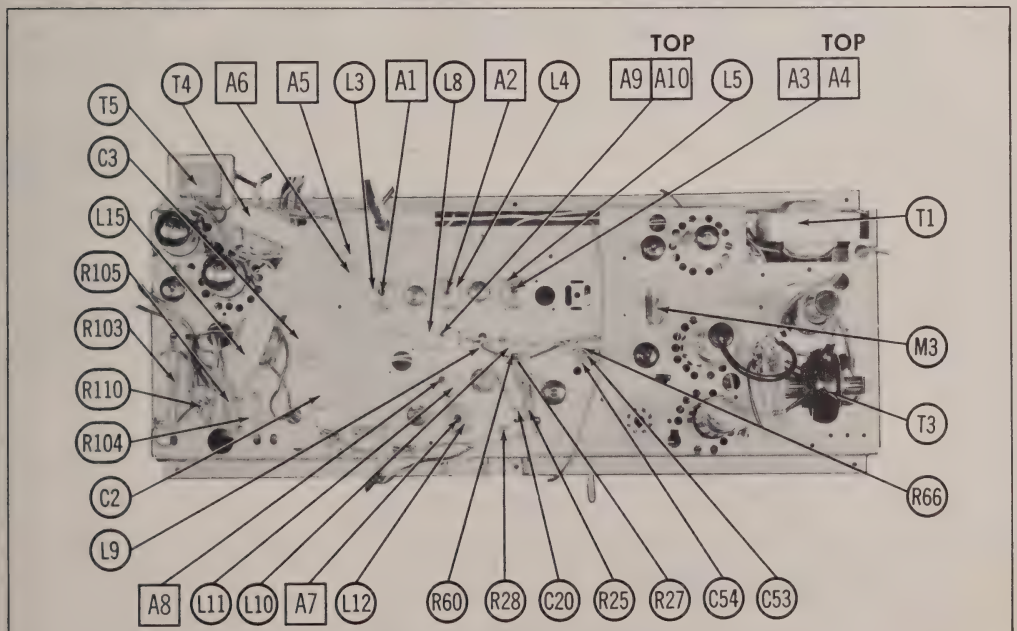
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	4700Ω	
R202	1000Ω	
R203	100K	

ITEM No.	RATING	REMARKS
R204	220K	
R205	10K	
R206	10K	

ITEM No.	RATING	REMARKS
R207	15K(5600Ω)*	* Alternate value.
R208	1000Ω	



TV CHASSIS —TOP VIEW

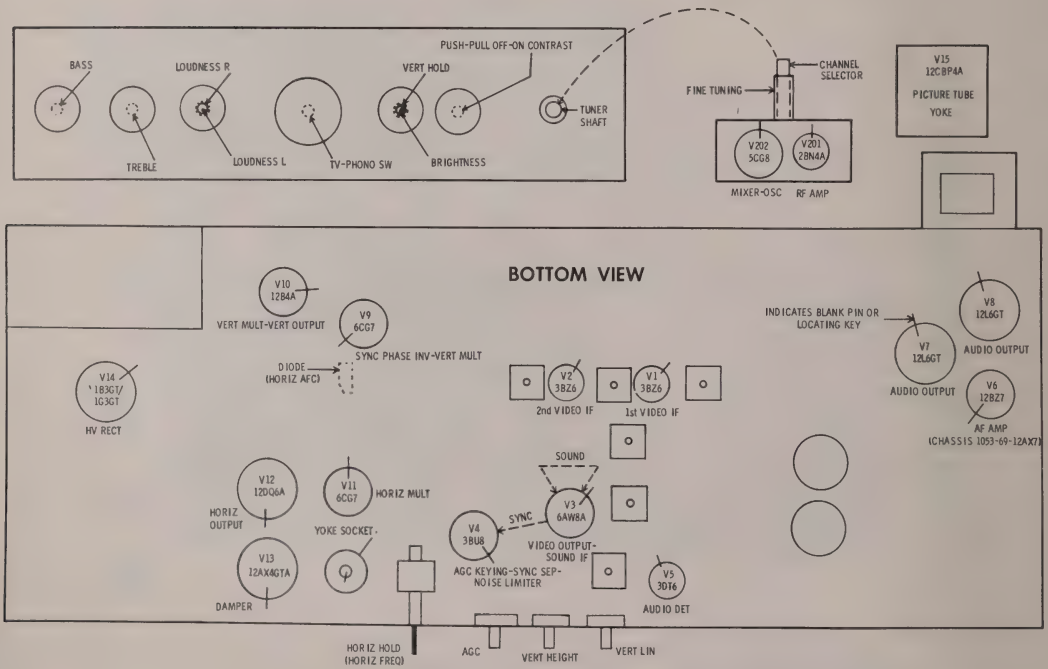
TRAV-LER MODELS 921-SP-925B, M, W (Ch. 1053-69, 1057-79)

FOLDER 2

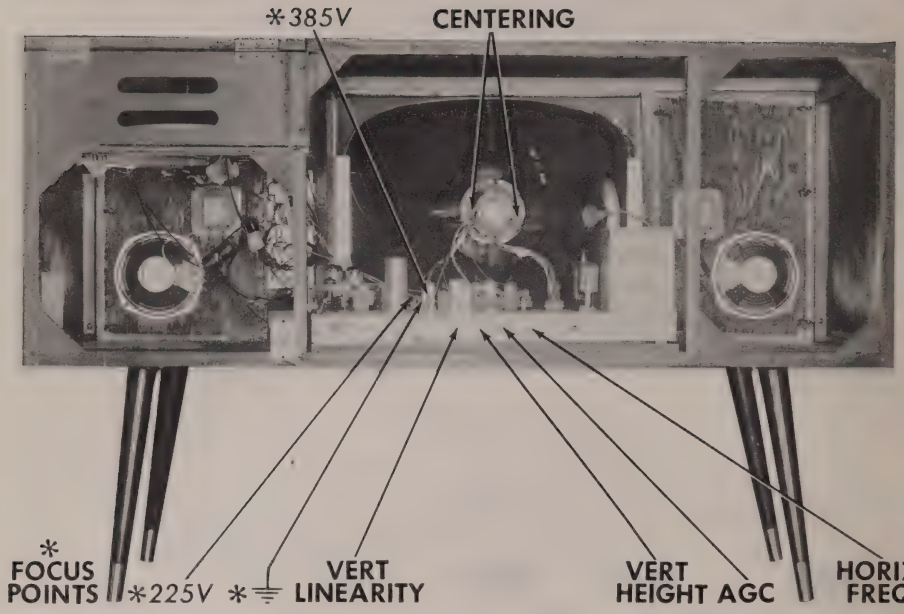
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	150K	33Ω	10.5Ω	11Ω	†7300Ω	†7300Ω	0Ω		
V2	3BZ6	.4Ω	220Ω	11Ω	11.5Ω	†5600Ω	†5600Ω	0Ω		
V3	6AW8A	0Ω	100K	†105K	13Ω	11.5Ω	● 40Ω	6900Ω	†8000Ω	†7500Ω
V4	3BU8	†6800Ω	†8200Ω	2.3meg	13.5Ω	13Ω	†45K	†390K	†47K	†4.7meg
V5	3DT6	18Ω	680Ω	9.5Ω	10.5Ω	†330K	†15K	560K		
V6	12BZ7	†475K	2.2meg	270Ω	3Ω	3Ω	†475K	2.2meg	270Ω	1.5Ω
V7	12L6GT	NC	5.5Ω	†810Ω	†7100Ω	470K	TP	8Ω	220Ω	
V8	12L6GT	NC	3Ω	†810Ω	†7100Ω	470K	TP	5.5Ω	220Ω	
V9	6CG7	●† 2.3meg	220K	● 180K	16.5Ω	15Ω	†12K	1.6meg	3300Ω	0Ω
V10	12B4A	● 1000Ω	2.2meg	16.5Ω	18Ω	18Ω	NC	2.2meg	NC	†330Ω
V11	6CG7	†7600Ω	800Ω	1200Ω	15Ω	13.5Ω	†100K	68K	1200Ω	0Ω
V12	12DQ6A	NC	18Ω	NC	†12K	470K	TP	22Ω	0Ω	TOP CAP †17Ω
V13	12AX4GT	NC	NC	¶650K	NC	†46Ω	NC	22Ω	26Ω	
V14	1B3GT 1G3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †457Ω
V15	21CBP4A	8Ω	22K	Pin 6 †120K	Pin 10 †150K	Pin 11 ● 120K	Pin 12 9.5Ω			
V16	2BN4A	0Ω	3meg	0Ω	.5Ω	†7850Ω	0Ω	3meg		
V17	5CG8	10K	†22K	0Ω	1.5Ω	.5Ω	†7850Ω	†17K	0Ω	320K

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 250V SOURCE. NC NO CONNECTION
† MEASURED FROM PIN 3 OF V13. TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast controls for a normal picture.

Turn the Horizontal Frequency (Hold) clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 10 push-on type knobs from front of cabinet.
2. Remove 8 wood screws holding rear cover. Remove antenna lead. Remove rear cover.
3. Remove phono motor and pick-up leads, speaker leads, yoke plug, picture tube socket, hi voltage lead, stereo jack, and picture tube mounting bracket ground lead.
4. Remove 3 nuts holding front control and tuner bracket. Remove 1 Phillips head wood screw holding bracket inside record changer compartment.
5. Remove 4 bolts holding chassis under cabinet.
6. Remove chassis.

PICTURE TUBE REMOVAL

1. Remove chassis.
2. Remove 4 bolts from bottom of cabinet holding picture tube and chassis mounting board.
3. Remove picture tube and board from cabinet.
4. Loosen picture tube mounting strap and remove picture tube.

PHOTOFACT® Folder

**PRODUCTION CHANGE
BULLETIN 239**

PRODUCTION CHANGE
BULLETIN 239

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 236

STROMBERG-CARLSON MODELS 621A SERIES, 622 SERIES

Stromberg-Carlson Models 621A Series and 622 Series were covered in PHOTOFACT Folder 13 - Set 236

Effective with Code Date 54-121 the 621A Series and 622 Series will be equipped with a four stage Video IF Circuit. A partial schematic diagram showing the new IF circuit is given in this bulletin.

When the four stage IF Circuit is used there were changes made in the Video Amp, Circuit.

COMPONENT CHANGES

L32 is changes to Part #114637.

L33 is changed to Part #114768.

L34 is changed to Part #114769.

L35 is changed to Part #114770.

WIRING CHANGE

The sync takeoff lead is relocated from the junction of L34 and L35 to the junction of L35 and R42.

(Continued On Reverse Side)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 463

AIRLINE MODELS WG-4087A, WG-4187A, WG-5081A, WG-5091A, WG-5181A, WG-5191A

Airline Models WG-4082A, WG-4092A, WG-4182A, WG-4192A, WG-5082A, WG-5086A, WG-5087A, WG-5088A, WG-5092A, WG-5097A, WG-5182A, WG-5186A, WG-5187A, WG-5188A, WG-5192A, WG-5197A were covered in PHOTOFACT Folder 1 - Set 463.

Models WG-4087A, WG-4187A, WG-5081A, WG-5091A, WG-5181A, WG-5191A are added along with late production changes with the publication of this bulletin.

COMPONENT CHANGES

R2 (Brightness Control) is changed to Part #40X423. The replacement for this control is given in this bulletin.

R4 (Vertical Hold Control) is changed to Part #40X425. The replacement for this control is given in this bulletin.

L13 (Horizontal Oscillator Transformer) is changed to Part #9A2371.

TUNER CHANGE

Some of the new models added may use Tuners #25A1185 or 25A1189. A schematic diagram and parts list covering these tuners may be found in PHOTOFACT Folder 2 in Set 472.

PRODUCTION CHANGE
BULLETIN 239

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R2A	500K	½	40X423	B-59	A47-500K-S	Q11-133	TA55L	Brightness
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	1meg	½	40X425	B-69	A47-1meg-S	Q11-137	TA16L	Vert. Hold
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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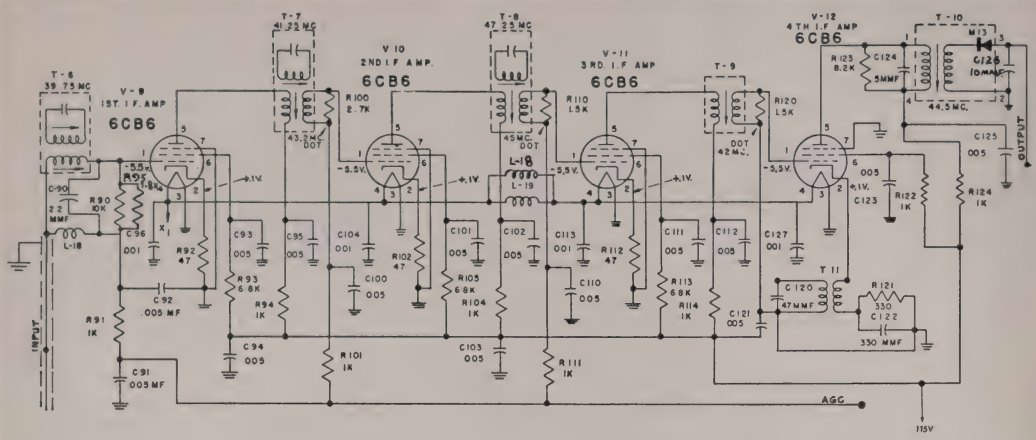
SET 490 FOLDER 3


T-6
39.75 MC
V-9
1ST. I.F. AMP
6CB6
T-7
41.22 MC
45.75MC DOT
V 10
2ND I.F AMP.
6CB6
T-8
47.25 MC
45MC DOT
V-11
3RD. I.F AMP
6CB6
T-9
DOT
42 Mc.
V-12
4TH I.F AMP
6CB6
T-10
M13
C125
10MMF
44.5MC.
OUTPUT
INPUT
C90
2.2 MMF
L-18
R90 10K
R95 1.8K
C96 .001
X1
R92 47
C92 .005 MF
R91 1K
C91 .005 MF
C93 .005
R93 6.8K
R94 1K
C94 .005
C95 .005
R101 1K
R100 2.7K
C104 .001
C100 .005
R102 47
C101 .005
R105 6.8K
R104 1K
C103 .005
C102 .005
L-18
L-19
R110 1.5K
C113 .001
C110 .005
R112 47
R111 1K
C111 .005
R113 6.8K
R114 1K
C112 .005
C121 .005
R120 1.5K
C127 .001
C120 47MMF
T 11
R121 330
C122 330 MMF
R123 8.2K
C124 5MMF
C125 .005
R122 1K
C123 .005
R124 1K
+1V.
-5.5V.
AGC
115V

RCA Victor Models 210DK595, U, 210DK596, 210DK597, 210DK635, U, 210DK636, 210DT572, U, 210DT575, 210DT577 (Ch. KCS129A, B, C, D, E, F) were covered in PHOTOFACT Folder 2 - Set 463.

The following Models and Chassis are added along with late production changes with the publication of this bulletin:

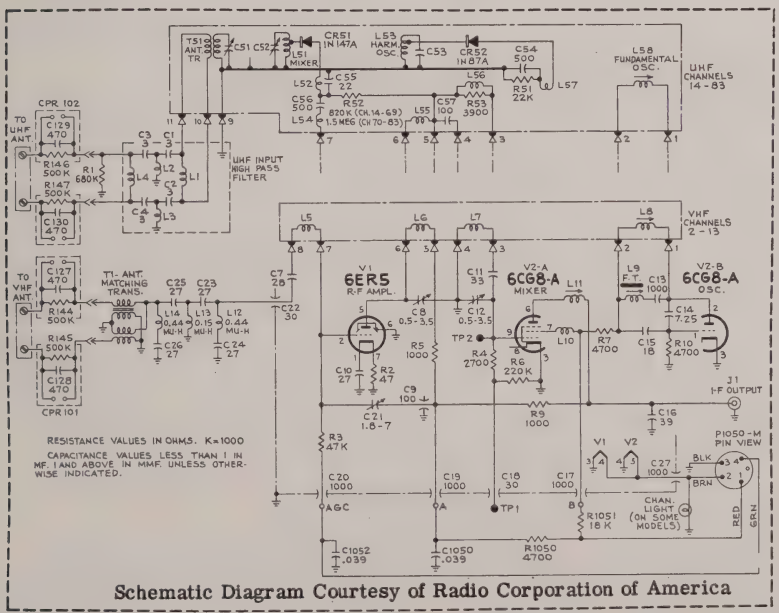
MODEL	CHASSIS	TUNER
210DK635SU	KCS129ZE	KRK87E
210DK655	KCS129M	KRK72M
210DK656	KCS129M	KRK72M
210DK657	KCS129M	KRK72M
210DK670	KCS129M	KRK72M
210DK674	KCS129M	KRK72M
*210DKR655SU	KCS129ZAA	KRK87D
*210DKR656SU	KCS129ZAA	KRK87D
*210DKR657SU	KCS129ZAA	KRK87D
*210DKR670SU	KCS129ZAA	KRK87D
*210DKR674SU	KCS129ZAA	KRK87D
*210DKR715	KCS129H	KRK72P
*210DKR715SU	KCS129ZH	KRK87C
*210DKR716	KCS129H	KRK72P
*210DKR716SU	KCS129ZH	KRK87C

*These Models incorporate a Remote Control Receiver (CTP9A) and a Remote Control Transmitter (CRK3B). A schematic diagram showing the Transmitter and Receiver may be found in PHOTOFACT Folder 1 - Set 461.

TUNER ADDED

UHF/VHF Tuner (KRK87C, D, E) is added during late production. A schematic diagram of this Tuner is given below in this bulletin.

(Continued On Reverse Side)



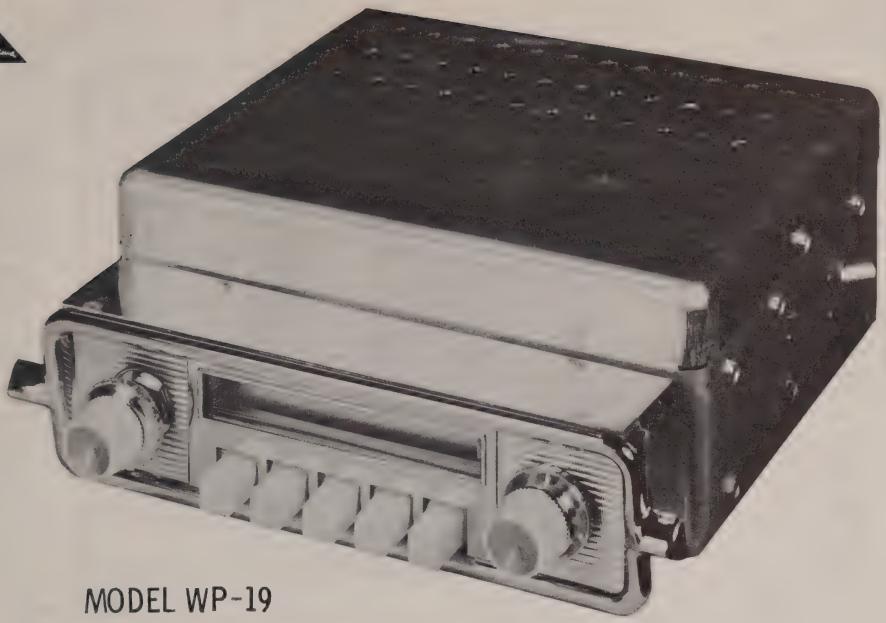
Schematic Diagram Courtesy of Radio Corporation of America

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	107515	Models 210DK635SU, 655, 656, 657, 670, 674, 210DKR655SU, 656SU, 657SU, 670SU, 674SU, 715, SU, 716, SU
Mask	107688	Models 210DK635SU, 655, 656, 657, 670, 674, 210DKR655SU, 656SU, 657SU, 670SU, 674SU, 715, SU, 716, SU
Knob	106526	VHF Channel Selector, Models 210DK655, 670, 210DKR655SU, 670SU
Knob	106527	VHF Channel Selector, Models 210DK657, 210DKR657SU
Knob	107654	VHF Channel Selector, Models 210DK656, 210DKR656SU
Knob	106528	VHF Channel Selector, Models 210DK674, 210DKR674SU
Knob	107372	Channel Selector & Dial Assembly, Models 210DKR715, 716
Knob	107738	UHF/VHF Channel Selector Assembly, Models 210DK635SU, 210DKR715SU, 716SU
Knob	104071	UHF Channel Selector, Models 210DKR655SU, 670SU
Knob	107621	UHF Channel Selector, Model 210DKR656SU
Knob	104405	UHF Channel Selector, Model 210DKR674SU
Knob	106596	Fine Tuning, Models 210DK635SU, 210DKR715, SU, 716, SU
Knob	106530	Fine Tuning, Models 210DK657, 210DKR657SU
Knob	106529	Fine Tuning, Models 210DK655, 210DK670, 210DKR655SU, 670SU
Knob	107225	Fine Tuning, Models 210DK674, 210DKR674SU
Knob	107583	Fine Tuning, Models 210DK656, 210DKR656SU
Knob	106102	UHF Dial, Models 210DKR655SU, 670SU
Knob	106103	UHF Dial, Models 210DKR656SU, 674SU
Knob	104072	UHF Dial, Model 210DKR657SU
Knob	107264	Off-On-Volume, Contrast, Model 210DK635SU
Knob	107656	Off-On-Volume, Model 210DK674
Knob	107712	Off-On-Volume, Model 210DKR674SU
Knob	107482	Off-On-Volume, Contrast, Models 210DK655, 670
Knob	107484	Off-On-Volume, Contrast, Model 210DK656
Knob	107488	Brightness
Knob	107490	Vertical Hold
Knob	107489	Horizontal Hold
Knob	107713	Tone, Models 210DK655, 670, 210DKR655SU, 670SU
Knob	107812	Tone, Models 210DK656, 210DKR656SU
Knob	107811	Tone, Models 210DK657, 210DKR657SU
Knob	107714	Tone, Models 210DK674, 210DKR674SU
Knob	107343	Resolution Switch, Models 210DK635SU, 657, 210DKR715, SU, 716, SU
Knob	107584	Resolution Switch, Models 210DK655, 670
Knob	107586	Resolution Switch, Models 210DK656, 210DKR656SU
Knob	107585	Resolution Switch, Models 210DK657, 210DKR657SU
Knob	107712	Resolution Switch, Model 210DK674
Knob	107845	Resolution Switch, Model 210DKR655SU
Knob	107847	Resolution Switch, Model 210DKR656SU
Knob	107846	Resolution Switch, Model 210DKR657SU
Knob	107848	Resolution Switch, Model 210DKR674SU
Cabinet	X4632	Model 210DK635SU
Cabinet	X4661	Model 210DK655
Cabinet	X4662	Model 210DK656
Cabinet	X4663	Model 210DK657
Cabinet	X4648	Model 210DK670
Cabinet	X4649	Model 210DK674
Cabinet	X4656	Models 210DKR715, SU
Cabinet	X4657	Models 210DKR716, SU

PHOTOFACT® Folder



MODEL WP-19

TRADE NAME	Automatic Models W-89, WP-19 (For 1958-1959 Volkswagen)
MANUFACTURER	Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston 15, Mass.
TYPE SET	Battery Operated 6 Tube Custom Built Automobile AM Receiver
POWER SUPPLY	6 Volt Storage Battery RATING 4.7 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	538 — 1610KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A1 thru A4..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5, A6, A7.....GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	265KC (400∿ Mod.)	High end stop.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1610KC	"	"	A5	"
3.	High side thru 68mmf to antenna receptacle. Low side to chassis.	"	"	"	A6, A7	"
4.	With radio installed in car and antenna fully extended, tune in a weak station near 1400KC and adjust A7 for maximum output.					

PUSHBUTTON ADJUSTMENT

1. Tune manually to desired station.
2. Pull button out, then press in firmly.
3. Repeat for remaining buttons.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JD715

AUTOMATIC MODELS
W-89, WP-19
AUTOMATIC MODELS
W-89, WP-19
SET490 FOLDER 4

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆			◆ RAYTHEON ◆ SYLVANIA ◆		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amplifier	6BA6 Note 1	V4	Det. -AVC-AF Amp.	6AV6
V2	Converter	6BE6	V5	Output	6AQ5
V3	IF Amplifier	6BA6	V6	Rectifier	6X4

Note 1. Model W-89 uses 6AU6 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■20	350	20-86S	AFH3-107	C0800	FP329.5	TMT-92	TVL-3635	
B	▲20	350							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2		#28-800						
C3	40 NPO		NPO-DI 39	TCZ-39	C10Q39C	CCTO-390	CNO-439	10TCC-Q39
C4	.1 200V	(.05) †	P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C5	.1 200V	(.05) †	P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C6	5 NPO 10%		NPO-SI 5.0	TCZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C7A								
B		#28-4046						
C	40		NPO-DI 39	TCZ-39	C10Q39C	CCTO-390	CNO-439	10TCC-Q39
C8	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C9	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D5
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C11	.007 1600V	(.01) †	P1684CM-007	DD16-702	CUB16D7	16DP-3-702	GEM-1627	MB-D7
C12	3000	Note 1	BPD-003	DD-302	BYA10D3	CCD-302	GP230	5HK-D30
C13	.47 100V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C14	.04 1000V		P1088N-04	DD-403		16DP-5-403	GEM-1014	
C15	.47 100V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47

Note 1. Not used in some versions.
Automatic Part Number.
† Alternate Value.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AUTOMATIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	80A1190	F1-67	RTV-692-C		■ UE4100-S	Tone
B	500K 85K Tap	½		R2-45				Volume
C	Bushing			AK-26	XB2			
D	Switch			KR-4				Power Off-On

■ "STA-LOC" Equivalent: FE26L, RU55T15, OS1687, IS2125, US41.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

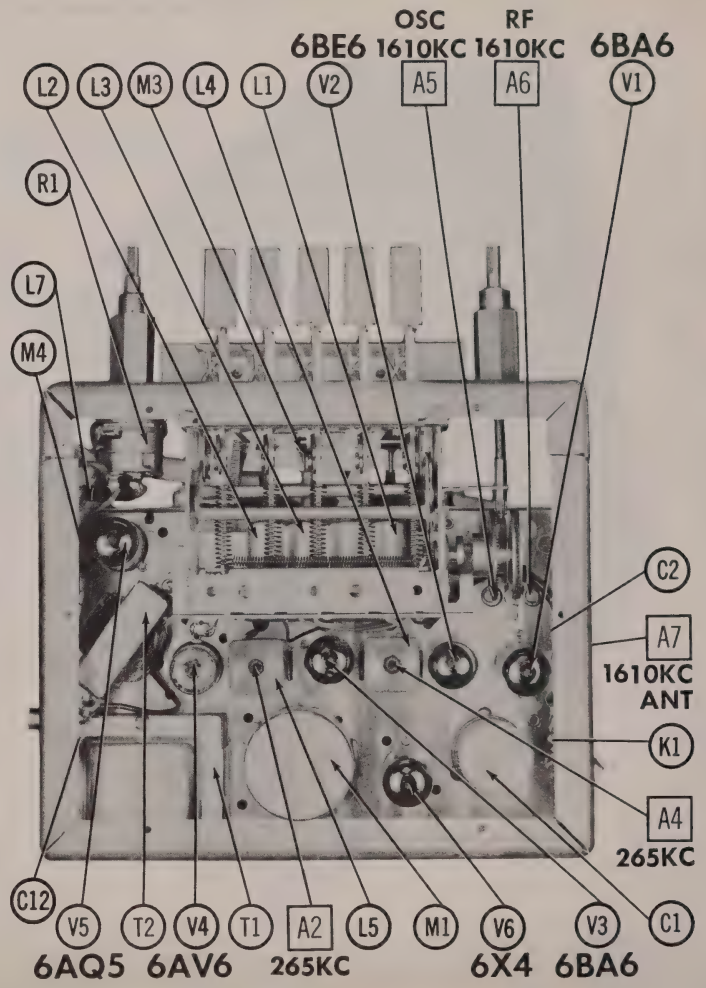
ITEM No.	RATING	REMARKS
R2	1.2meg	(2.2meg) *
R3	470K	
R4	68Ω	(330Ω) *
R5	150K	
R6	47K	

ITEM No.	RATING	REMARKS
R7	6800Ω 2W	
R8	1500Ω	(820Ω) *
R9	47K	
R10	100K	
R11	270Ω 1W	

ITEM No.	RATING	REMARKS
R12	4.7meg	①
R13	2200Ω 2W	
R14	68Ω	
R15	68Ω	

* Alternate Value.
① Not used in all versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AUTOMATIC PART No.	REPLACEMENT DATA	
K1 K2	Antenna Filter Audio Coupling	100mmf, 1.2meg 220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	89-4204 89-151	Sprague Aerovox Centralab Cornell-Dubilier Mallory Sprague	PRC-9 PA-113-2 PC-151 116TM2 MS-107 DT-2

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		AUTOMATIC PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil							
L2	RF Coil							
L3	Osc. Coil							
L4	Input IF Trans.	14-265	16-6752	16-6752	BC-350	12-H1	RF-3	
L5	Output IF Trans.	14-265	16-6752	16-6752	BC-350	12-H1	RF-3	
L6	Hash Choke	14-205						10uh
L7	"A" Lead Hash Choke	14-205						10uh

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6V@ 2.5A	440 VCT @.042A		76A1204-6	22R63①				22R63①	

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5800Ω	3-4Ω	75A1203	24S51	A-2930	AU-601	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AUTOMATIC PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	73-272	5A15	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				AUTOMATIC PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interruptor	6V	115v	113-83	5715	1501	7515	

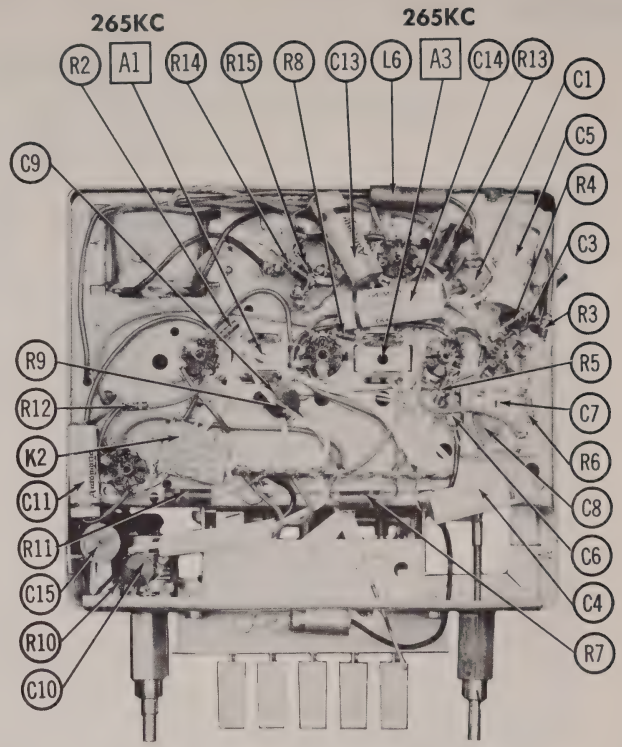
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AUTOMATIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	7 1/2A 32V	108-100		307007.5 (SFE7½A32V)	155009	SFE 7½	HHH

MISCELLANEOUS

ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M3	Tuner	78B1191	Push Button
M4	Tuner Spark Plate	78A1205	Manual

CHASSIS—BOTTOM VIEW



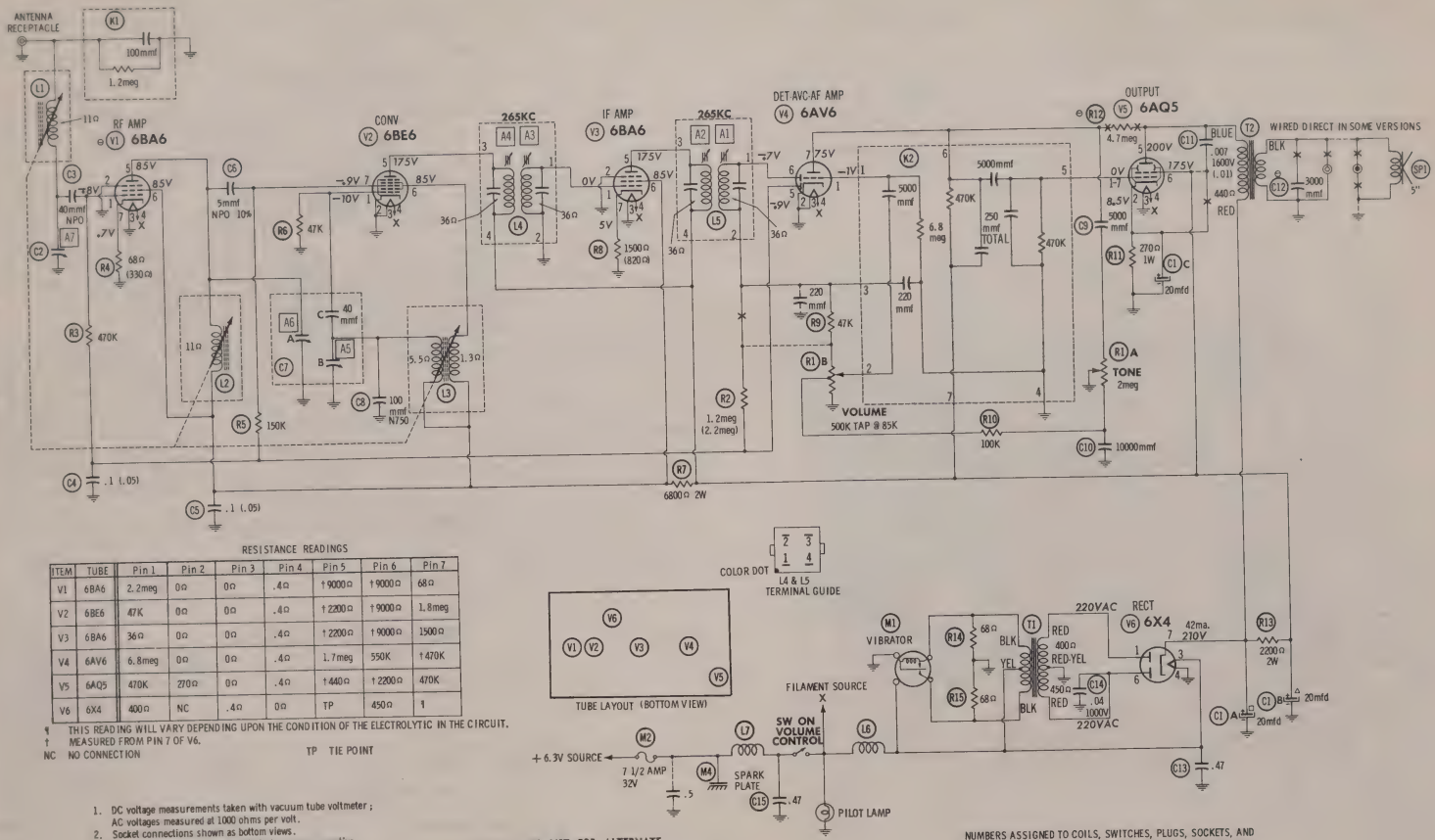
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	47B319-2W	Tuning, Volume
Knob	47B393	Tone
Knob	47B393-1	Dummy
Dial Scale	39D1194	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BA6	2.2meg	0Ω	0Ω	.4Ω	†9000Ω	†9000Ω	68Ω
V2	6BE6	47K	0Ω	0Ω	.4Ω	†2200Ω	†9000Ω	1.8meg
V3	6BA6	36Ω	0Ω	0Ω	.4Ω	†2200Ω	†9000Ω	1500Ω
V4	6AV6	6.8meg	0Ω	0Ω	.4Ω	1.7meg	550K	†470K
V5	6AQ5	470K	270Ω	0Ω	.4Ω	†440Ω	†2200Ω	470K
V6	6X4	400Ω	NC	.4Ω	0Ω	TP	450Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V6.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

AUTOMATIC MODELS W-89, WP-19

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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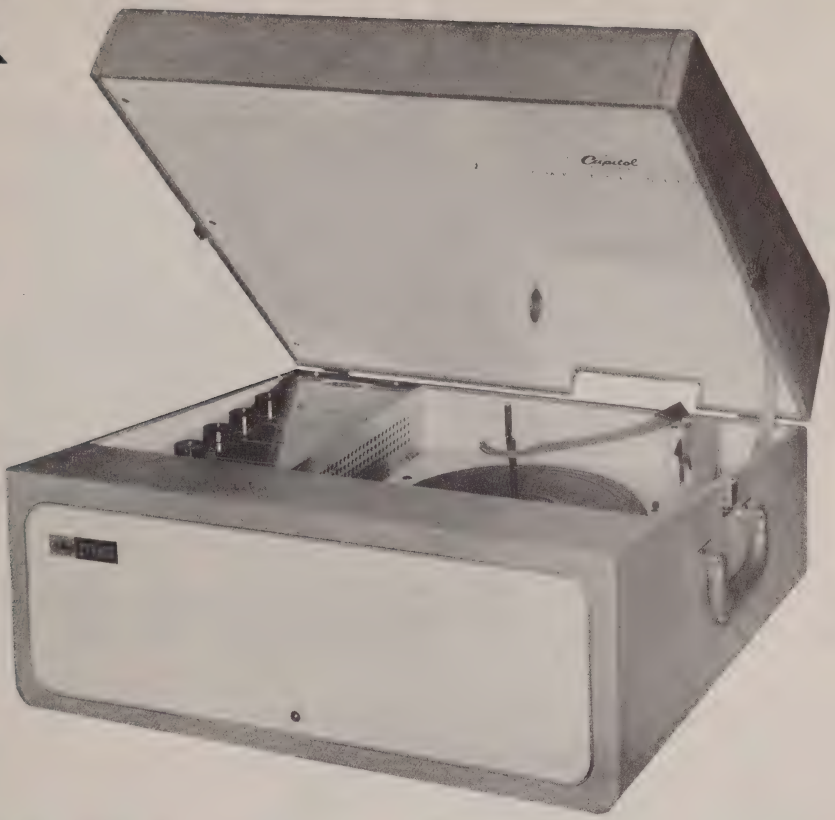
PHOTOFACT® Folder

**CAPITOL
MODEL 928**

CAPITOL
MODEL 928



CAPITOL
MODEL 928

TRADE NAME	Capitol Model 928
MANUFACTURER	Capitol Records, Inc., 1 S. Webster Ave., Scranton 5, Pa.
TYPE SET	AC Operated 4 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 62 Watts, .6 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #1210B-495 — SEE V-M 1201 — PHOTOFACT SET 436 FOLDER 18

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JT912

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	CBS • GENERAL ELECTRIC • TYPE	ITEM No.	USE	RAYTHEON • SYLVANIA • TYPE
V1	Left Channel AF Amp. - Right Channel AF Amp.	ECC83 (12AX7) •	V3	Right Channel Output	EL84
V2	Left Channel Output	EL84	V4	Rectifier	EZ81

• Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	CAPITOL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	165-002		DO674	FP375.6	TMQ-65	TVL-4739	
B	■40	350			BR505	TC29	TD-50-50	TVA-1206	
C	▲20	300							
D	50	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	47		DI-47	DD-470	L10Q47	CCD-447	GP447	10TS-Q47
C3	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C4	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C5	.25 200V		P288N-25		CUB2P25	2DP-4-254	GEM-2025	2TM-P25
C6	47		DI-47	DD-470	L10Q47	CCD-447	GP447	10TS-Q47
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C8	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C9	.25 200V		P288N-25		CUB2P25	2DP-4-254	GEM-2025	2TM-P25
C10	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C11	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CAPITOL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3meg		133-800	B-85			FC36A	Loudness, Left Channel
B	3meg			SR-85			RU36A	Loudness, Right Channel
C	Shaft			Not Req.			CS3500	
R2A	25K		133-375					Bass, Left Channel
B	25K							Bass, Right Channel
R3A	1500Ω		136-125				FA152L	Treble, Left Channel
B	1500Ω						RU152L	Treble, Right Channel
C	Shaft						CS3500	
R4A	500Ω		132-050	B-4	A47-500-S	Q11-103	U2	Balance
B	Shaft			Not Req.	K8S-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	6.8meg	
R6	470Ω	
R7	1500Ω	
R8	1000Ω	
R9	15Ω	

ITEM No.	RATING	REMARKS
R10	6.8meg	
R11	470Ω	
R12	1500Ω	
R13	1000Ω	
R14	8233W	

ITEM No.	RATING	REMARKS
R15	15Ω	
R16	270Ω	
R17	100Ω	
R18	270Ω 5W	
R19	1200Ω 1W	

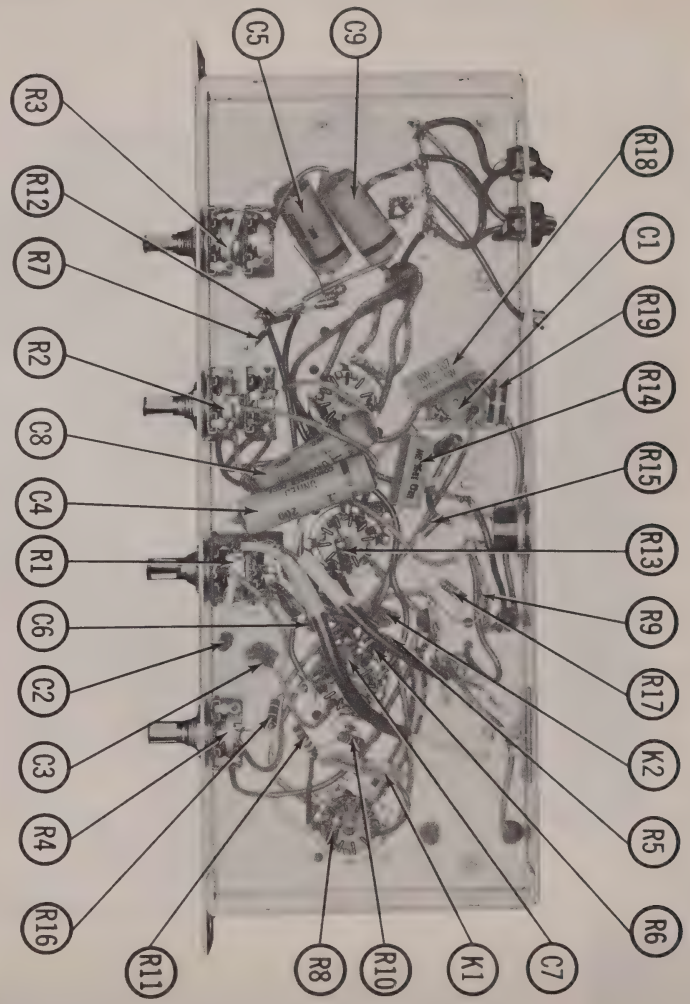
TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA CAPITOL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② .6A	500VCT ② .09A	6.3V ② 2.9A	200-001	24R31U ①	P-3148 ①		PC-8420 ①	24R31U ①	R-10A ①②

① Drill New Mounting Holes.

② Tape 5V Winding and Center Tap on 6.3V Winding.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CAPITOL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	
T2	2900Ω	3-4Ω	205-003							
T3	4700Ω CT	3-4Ω	210-002	24S05		AU-608	A-3850	24S05		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CAPITOL PART No.	QUAM PART No.	
SP1	6"x 9"	PM	3-4Ω	229-006	69A3	
SP2	3½"	PM	2-3Ω	229-005	3A15T	
SP3	6"x 9"	PM	3-4Ω	229-006	69A3	
SP4	3½"	PM	2-3Ω	229-005	3A15T	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	CAPITOL PART No.	REPLACEMENT DATA
K1	Audio Coupling	270mmf, 10000mmf, 270K, 470K	195-001	Aerovox PA-112-4 Centralab PC-81 Cornell-Dubilier 113TM2 Sprague T-2
K2	Audio Coupling	270mmf, 10000mmf, 270K, 470K	195-001	Aerovox PA-112-4 Centralab PC-81 Cornell-Dubilier 113TM2 Sprague T-2

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							
	CAPITOL PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M1	13TX (Includes M2)	13TX or 13T	Not Req.	13	Not Req.	A-44X or A-44XSD or A-44XDD	Not Req.	10TB2-S	Not Req.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	CAPITOL PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M2	(Part of M1)	* W-204DS †♦ * W-204DD-1♦	* A-44X † or * A-44XSD †♦ or * A-44XDD ♦	† Jewel ♦ Diamond * Includes Cartridge

MISCELLANEOUS

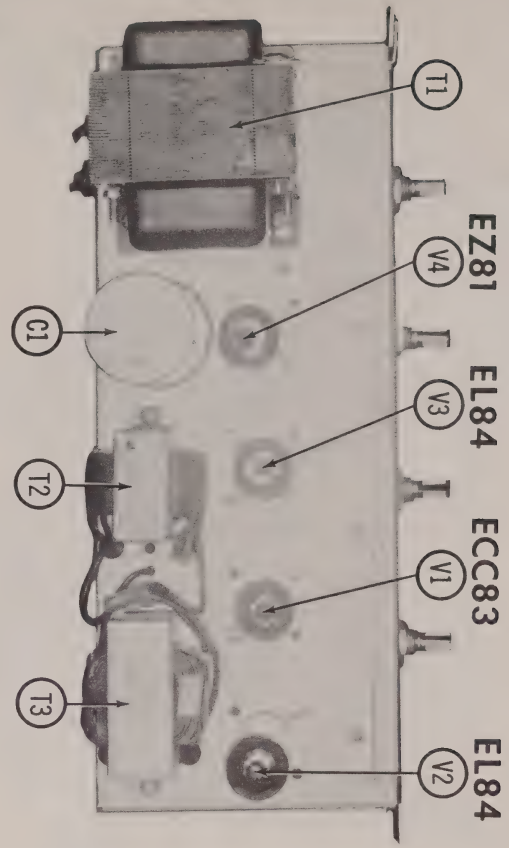
ITEM No.	PART NAME	CAPITOL PART No.	NOTES
M3	Switch		Off-On (Part of Changer)
M4	Motor		Drive (Part of Changer)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

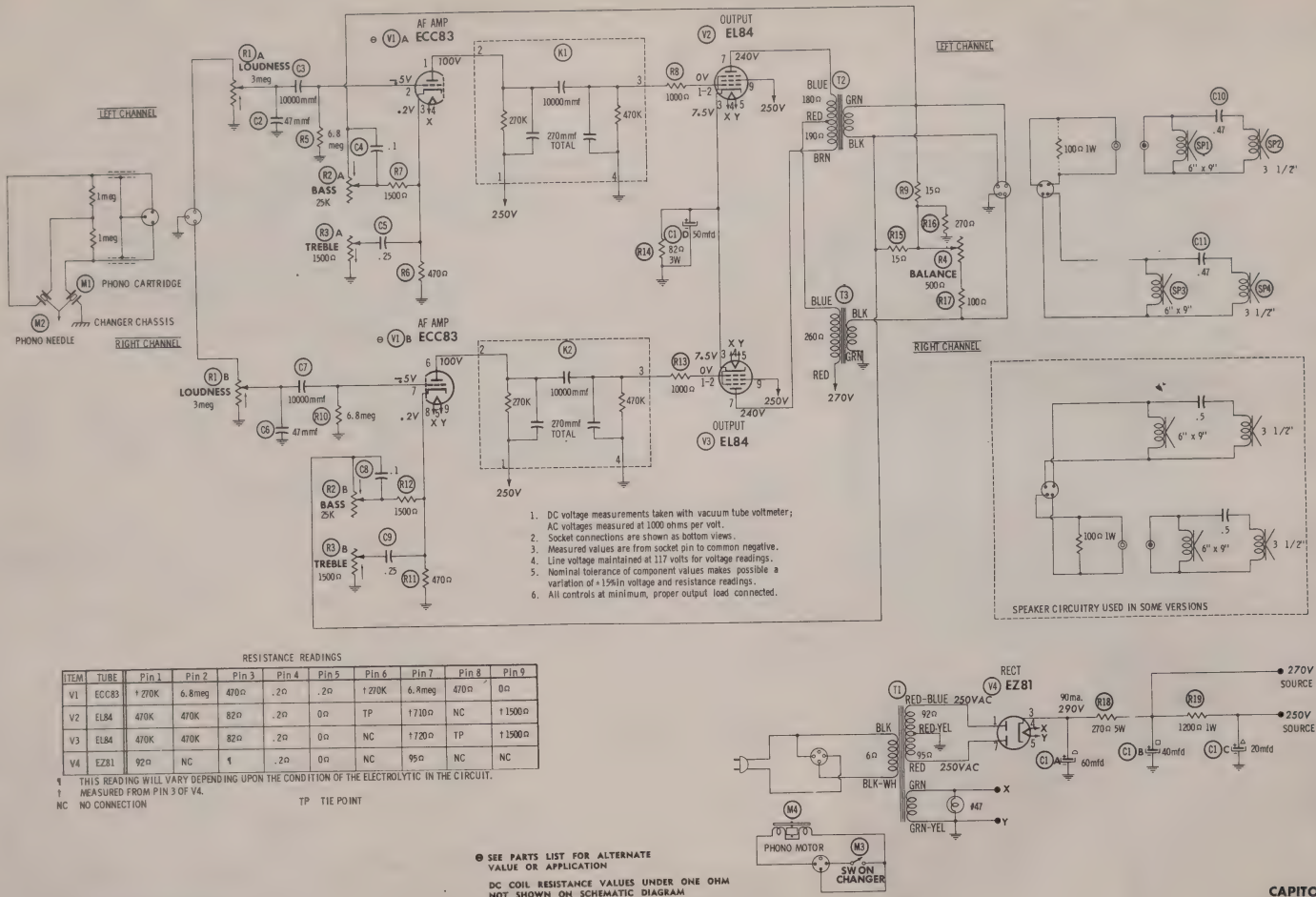
NAME	PART NO.	DESCRIPTION
Knob	305-007	All Controls
Cabinet	300-928G	

CHASSIS—TOP VIEW



WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83	†270K	6.8meg	470Ω	.2Ω	.2Ω	†270K	6.8meg	470Ω	0Ω
V2	EL84	470K	470K	82Ω	.2Ω	0Ω	TP	†710Ω	NC	†1500Ω
V3	EL84	470K	470K	82Ω	.2Ω	0Ω	NC	†720Ω	TP	†1500Ω
V4	EZ81	92Ω	NC	¶	.2Ω	0Ω	NC	95Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V4.
NC NO CONNECTION
TP TIE POINT

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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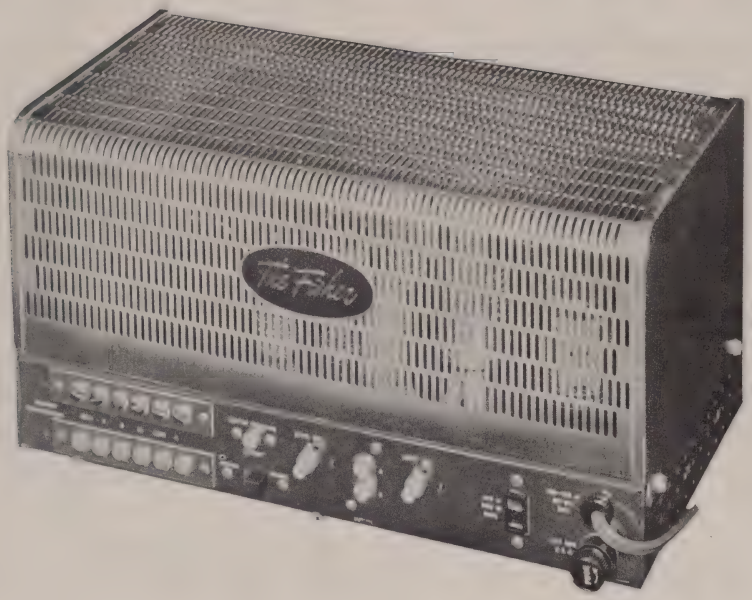
CAPITOL MODEL 928

PHOTOFACT® Folder

FISHER
MODEL SA-100

FISHER
MODEL SA-100



FISHER
MODEL SA-100

TRADE NAME	Fisher Model SA-100 (Serial #10001-19999)
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	AC Operated 7 Tube Stereo Amplifier
POWER SUPPLY	105-120 Volts AC, 50-60 Cycles RATING 155 Watts, 1.5 Amp @ 117 Volts AC (Measured with - 11V output tube grid bias)

ADJUSTMENTS

BIAS ADJUSTMENT

Connect speakers (or equivalent load resistors) to speaker terminals strip for each channel.
Remove the link from test point terminals on the front panel. Connect the DC probe of VTVM to channel "A" test terminal. Turn the channel "A" Bias Adjustment located on top of chassis for a meter reading of .6 volts. Repeat the procedure for channel "B". Reconnect links to test terminal strip.

DC BALANCE ADJUSTMENT

Connect the AC probe of a sensitive VTVM across the 16 ohm terminals of the Channel "A" speaker terminal strip. Adjust the Channel "A" DC Balance control for MINIMUM deflection of the VTVM. This reading should be .4 volts or less. Repeat this procedure for Channel "B".

AC BALANCE ADJUSTMENT

This adjustment should be periormed using an Intermodulation or Harmonic Distortion Analyzer. In this case, use normal adjustment procedure. If these instruments are not available, a close approximation may be made by setting the controls at center of rotation.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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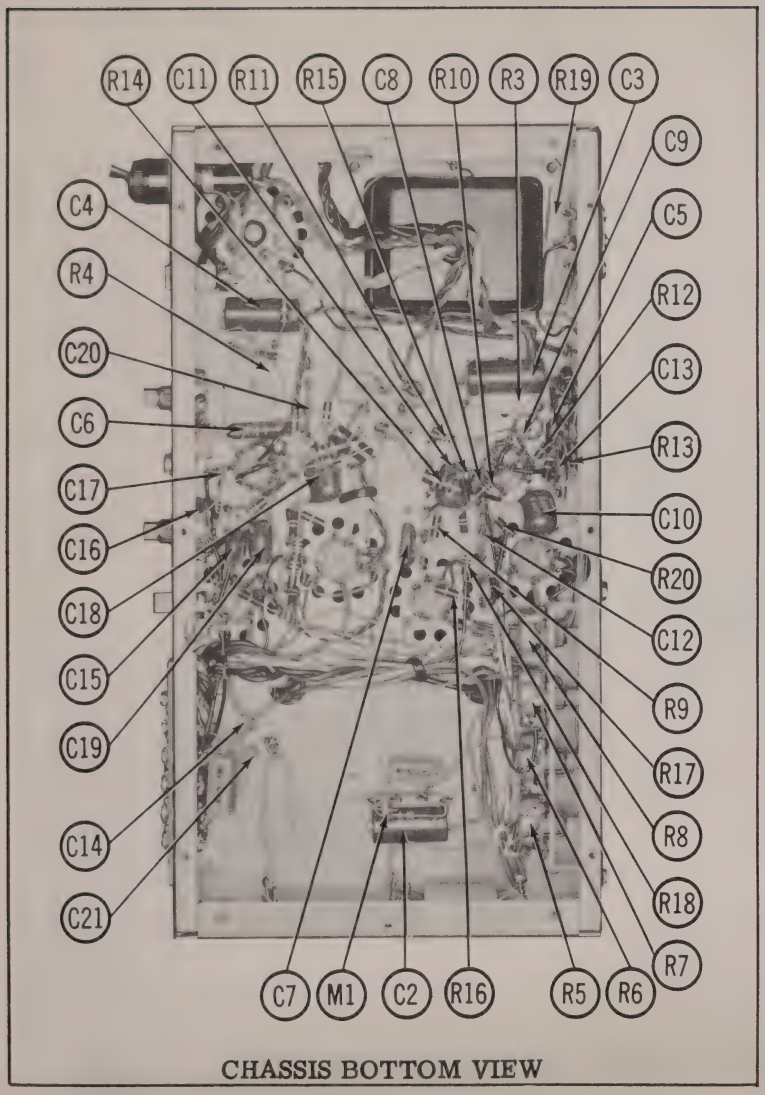
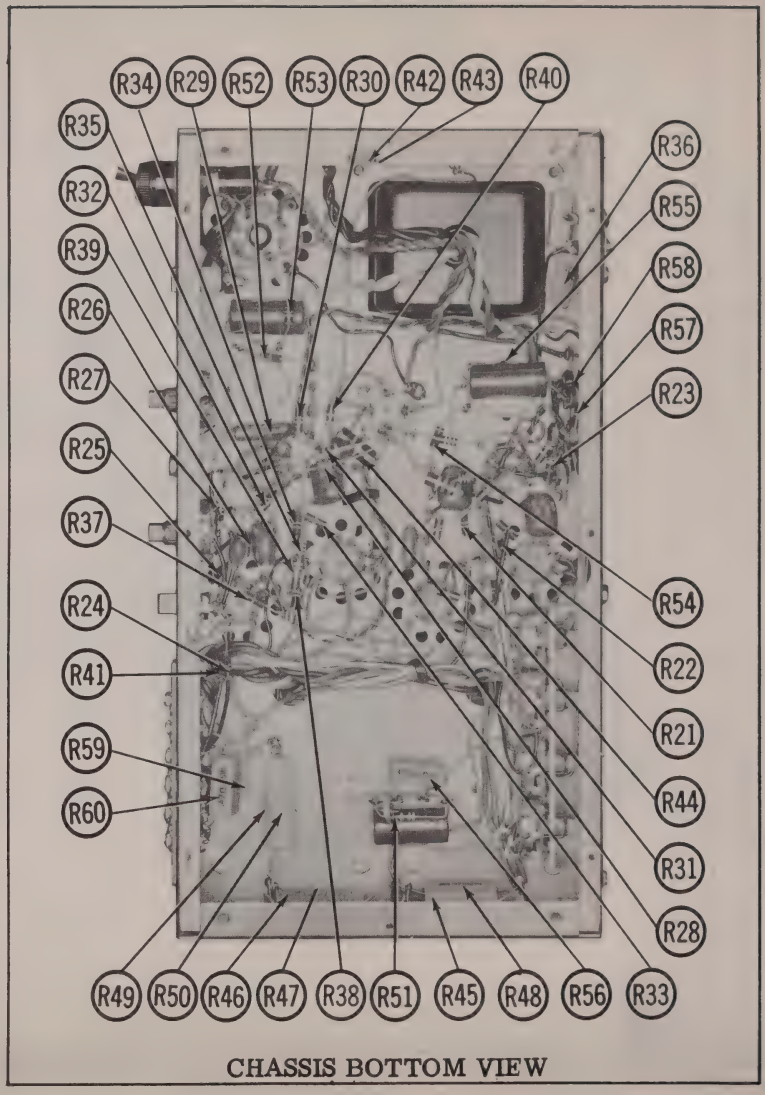
JV977

SET 490 FOLDER 6



CHASSIS BOTTOM VIEW



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A AF Amp - Phase Inverter	7247	V4	Channel B AF Amp Phase Inverter	7247
V2	Channel A Output	7189	V5	Channel B Output	7189
V3	Channel A Output	7189	V6	Channel B Output	7189
			V7	Rectifier	GZ34/5AR4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▰40	450	C50180-10	AFH4-18-10	DO171	FP446	TMQ-18	TVL-4840	
B	40	450							
C	▲10	450							
D	■10	450							
C2	50	50	C782-119	PRS1350	BR505	TC39	TD-50-50	TE-1307	
C3	50	50	C782-119	PRS1350	BR505	TC39	TD-50-50	TE-1307	
C4	50	50	C782-119	PRS1350	BR505	TC39	TD-50-50	TE-1307	
C5	25	6	C639-114	XPP-6025	NLW25-6	TT6X25	ML30-6	TE-1091	
C6	25	6	C639-114	XPP-6025	NLW25-6	TT6X25	ML30-6	TE-1091	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

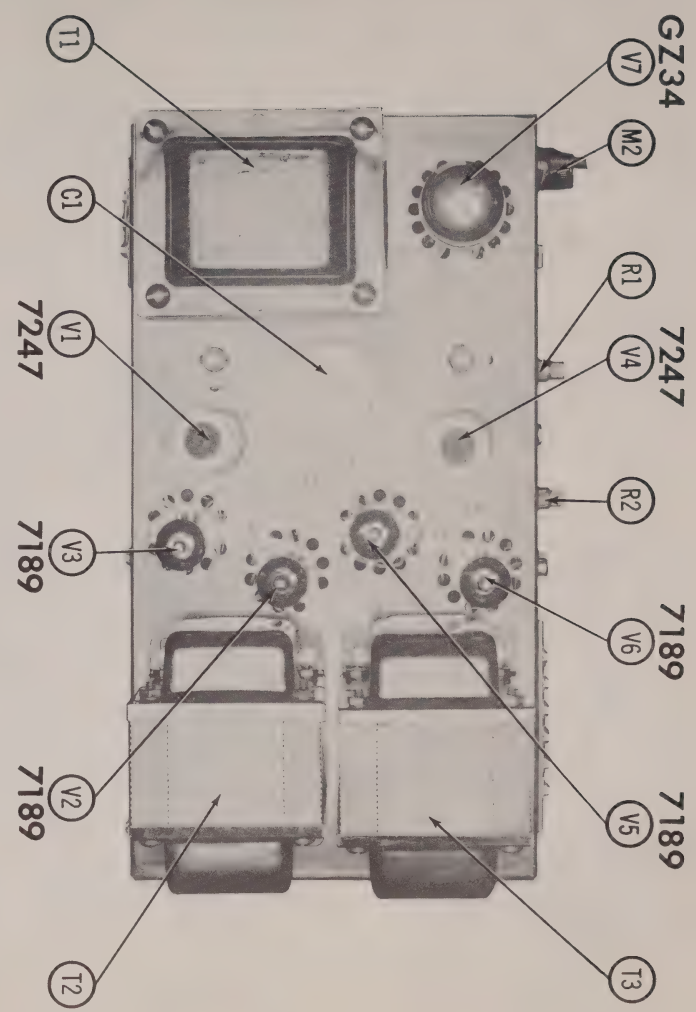
ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	.022 250V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C8	15 N75 10%	#C50070-18						
C9	2 NPO ±.25mmf		NPO-DI2.2		C10V2C			
C10	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C11	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C12	12 NPO 10%			TCZ-12	C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C13	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C14	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C15	.022 250V		P488N-022	DD-203	CUB4S47	4DD-2-223	GEM-4122	4TM-S22
C16	15 N75 10%	#C50070-18						
C17	2 NPO ±.25mmf		NPO-DI2.2		C10V2C			
C18	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C19	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C20	270 10%		DI-270	DD-271	L10T27	CCD-271	GP327	10TS-T27
C21	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33

#Fisher Part Number

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250K	½	R50103-1	AB-50	A47-250K-S	Q11-130	SU-46	Level, Channel A
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R2A	250K	½	R50103-1	AB-50	A47-250K-S	Q11-130	SU-46	Level, Channel B
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R3A	5000Ω	½	R50103-4	BX-10	A47-5000-S	Q11-114	U14	Bias, Channel A
B	Shaft		Not Req.	FKS-1/4	Not Req.	Not Req.	Not Req.	
R4A	5000Ω	½	R50103-4	BX-10	A47-5000-S	Q11-114	U14	Bias, Channel B
B	Shaft		Not Req.	FKS-1/4	Not Req.	Not Req.	Not Req.	
R5A	25K	½	R50103-2	AB-26	A47-25K-S	Q11-120	SU-29	DC Balance, Channel A
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R6A	50K	½	R50103-3	BX-31	A47-50K-S	Q11-123	SU-35	AC Balance, Channel A
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R7A	50K	½	R50103-3	BX-31	A47-50K-S	Q11-123	SU-35	AC Balance, Channel B
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R8A	25K	½	R50103-2	AB-26	A47-25K-S	Q11-120	SU-29	DC Balance, Channel B
B				AK-1	FKS-1/4	Not Req.	Not Req.	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R9	1meg	
R10	47K	
R11	680K	
R12	3900Ω	
R13	220Ω	
R14	68K 1W	
R15	39K	
R16	2200Ω	
R17	220K	
R18	47K	
R19	10Ω 2W	
R20	2200Ω	
R21	220K	
R22	47K	
R23	3900Ω	
R24	12K	
R25	1000Ω	
R26	1meg	

ITEM No.	RATING	REMARKS
R27	47K	
R28	680K	
R29	3900Ω	
R30	220Ω	
R31	68K 1W	
R32	39K	
R33	2200Ω	
R34	220K	
R35	47K	
R36	10Ω 2W	
R37	2200Ω	
R38	220K	
R39	47K	
R40	3900Ω	
R41	12K	
R42	250Ω 7W	
R43	250Ω 7W	
R44	22K 2W	

ITEM No.	RATING	REMARKS
R45	4000Ω 5W	
R46	7500Ω 7W	
R47	7500Ω 7W	
R48	4000Ω 5W	
R49	7500Ω 7W	
R50	7500Ω 7W	
R51	4700Ω	
R52	4700Ω	
R53	10K	
R54	4700Ω	
R55	10K	
R56	2200Ω 2W	
R57	220Ω	
R58	220Ω	
R59	.47Ω 5W	
R60	.47Ω 5W	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② 1.5A	720VCT ② .200A tap ② 65V ② .005A	5V ② 1.9A	T762-115B ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ② 4.1A									

① Alternate Part #T782-115

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6500Ω CT	16Ω tap ② 8Ω, 4Ω	T782-116-1	22S68				22S68		
T3	6500Ω CT	16Ω tap ② 8Ω, 4Ω	T782-116-2	22S68				22S68		

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	FISHER PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.005A	SR782-117 ①	2E4 ①	HA154 ①	K200 ①	SR200 ①	① Silicon Type

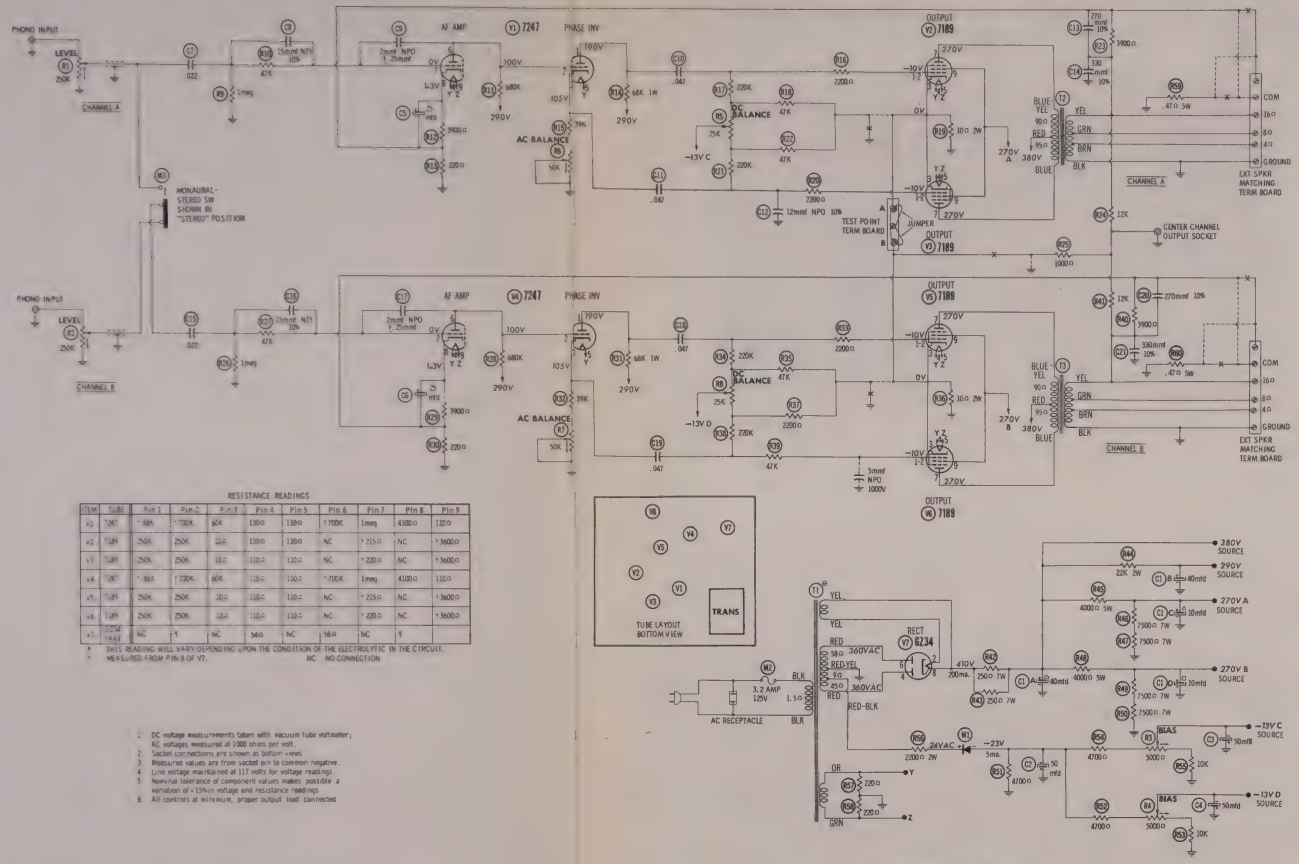
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FISHER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	3.2A 125V S/B	F3319		31303.2 (3.2A 125V S/B)	342001	MDX3 2/10	HKP

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
v1	7247	*68K	*700K	60K	110Ω	110Ω	*700K	1meg	410Ω	110Ω
v2	7189	250K	250K	22K	110Ω	110Ω	NC	*215Ω	NC	*360Ω
v3	7189	250K	250K	10K	110Ω	110Ω	NC	*220Ω	NC	*360Ω
v4	7247	*68K	*700K	60K	110Ω	110Ω	*700K	1meg	410Ω	110Ω
v5	7189	250K	250K	10K	110Ω	110Ω	NC	*215Ω	NC	*360Ω
v6	7189	250K	250K	22K	110Ω	110Ω	NC	*220Ω	NC	*360Ω
v7	6Z34	NC	1	NC	540	NC	540	NC	1	

* THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
NC NO CONNECTION
MEASURED FROM PIN 8 OF V7.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

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FISHER
MODEL SA-100

PHOTOFACT® Folder

FUJIYA CORDER
MODEL EX-311

FUJIYA CORDER
MODEL EX-311

FUJIYA CORDER
MODEL EX-311

GENERAL INFORMATION

The Fujiya Corder Model EX-311 records and plays back two tracks of material on standard-width recording tape. This doubles the recording and playing time without loss of quality or frequency response. Recordings can be made from a phonograph, radio, or television receiver, in addition to those made directly from the microphone.

A record safety lock prevents accidental erasure, and a Quick Stop control permits pauses to be made during a recording.

Model EX-311 has one tape speed, 3 3/4 ips. The playing and recording time is 90 minutes for a 900-foot reel of tape.

Model EX-311 operates on 60 cycles, 110-120 volts AC only. Be absolutely certain it agrees with these specifications before connecting to a supply line.

Supplied by:

U. S. Photo Supply Company
6478 Sligo Mill Road
Washington 12, D. C.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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CQ428

PREPARING FOR OPERATION

1. Remove the lid from the carrying case.
2. Remove the AC cord, microphone, and earphone from the storage compartment on the right side.
3. Plug the AC cord into a convenient outlet of the proper specifications.
4. Thread the tape (see "Threading the Tape").

FUNCTION OF CONTROLS

Off-Volume

Turning the knob clockwise until a click is heard turns the power on to the unit. Further rotation increases the volume.

Safety Button

The Safety Button, marked with an R on the escutcheon, must be depressed before the unit can be placed in Record. This prevents accidental erasure of a prerecorded tape.

Quick Stop

To stop the tape momentarily in Play or Record, pull the lever in the direction of the arrow. When the lever is released, the tape will start moving again.

Control Knob

The center is the stop position. Turning the knob to the left places the recorder in reverse to rewind the tape onto the supply reel. Turning the knob to the right places the recorder in Play and in Record when the Safety button is depressed.

OPERATING INSTRUCTIONS

Threading the Tape

1. Place a reel of tape on left reel cup (1) and an empty reel on right reel cup (1).
2. Unwind about 10 inches of tape. Hold a section taut and insert it into the tape slot, making certain the dull-coated side faces the rear of the recorder.
3. Insert the free end into one of the radial slots in the hub of the take-up reel. Turn the reel several turns counterclockwise to secure the tape to the reel and to take up the slack between reels.

To Record From a Microphone

1. Thread the tape (see "Threading the Tape").
2. Plug the microphone into the Mic jack.
3. Turn the Off-Volume control clockwise, and allow about 30 seconds for the tubes to warm up.
4. Depress the Safety Button and turn the Control Knob to Play-Record.
5. Hold the microphone 6 to 12 inches from your mouth and speak in a normal voice. Adjust the Off-Volume control until the record level indicator flashes on the loudest sound.

NOTE: Correct volume level is very important during a recording. Too weak a signal (record level indicator does not flash) will result in weak playback and high background noise. Too strong a signal (indicator flashes continuously) will result in distortion during playback.

To Record From a Radio

Recordings can be made from a radio by one of three methods:

1. Through a microphone, by pickup from a radio speaker:

   Place the microphone 6 to 12 inches in front of the radio speaker. Turn the radio volume control to a normal level. (Setting it too high will cause distortion.) Turn the radio tone control to treble or high. Set the recording level, and record as described under "To Record From a Microphone".

2. Through a direct connection to the radio speaker:

   Make up a shielded cable with a two-conductor phone plug on one end and two alligator clips on the other end. Connect the alligator clips across the voice-coil terminals of the radio speaker, and insert the phone plug into the Mic jack. Set the radio volume and tone controls as in Step 1. Set the recording level, and proceed as described under "To Record From a Microphone".

3. Through a direct connection to the radio volume control:

   Make up a shielded cable with a two-conductor phone plug on one end. Connect the other end across the radio volume control. Insert the phone plug into the Mic jack. Set the recording level, and proceed as described under "To Record From a Microphone". The radio volume and tone controls do not affect this setup; so they may be left in any position.

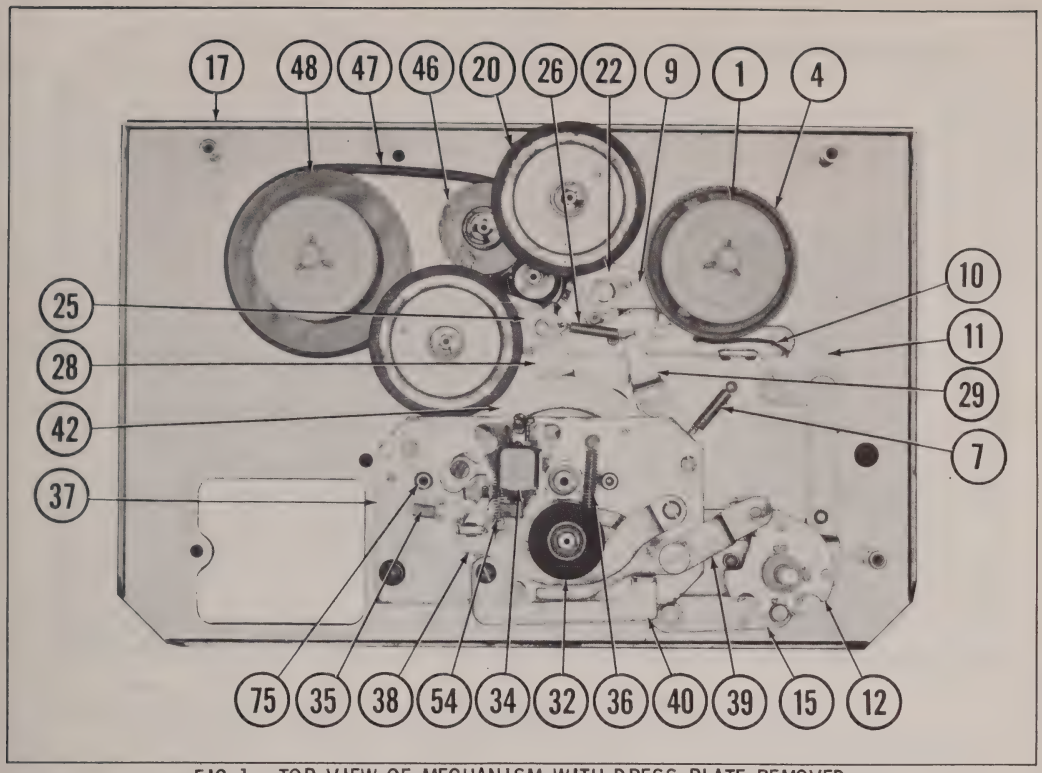


FIG.1 TOP VIEW OF MECHANISM WITH DRESS PLATE REMOVED

To Record From a Phonograph

1. If the phonograph has a phone-type plug on the pickup leads, insert it into the Mic jack. Set the recording level, and proceed as described under "To Record From a Microphone".

2. If the phonograph has a standard pin-type plug, an adapter is needed. Insert the plug into the adapter, and plug the adapter into the Mic jack.

To Record From a Television Receiver

Use one of the three methods described under "To Record From a Radio".

Dual Track Recording

These recorders record and play back on one-half the tape width at a time, thereby resulting in two-track recording. To record on the other half of the tape, remove the full reel from the takeup reel cup (1), turn the reel over and place it on the feed reel cup (1). The tape can be stopped and the reels turned over at any point during recording or playback.

Reverse

Turning the Control knob to the left, or reverse, position will rapidly rewind the tape.

To Play a Recording

1. Thread the tape (see "Threading the Tape").

2. Turn the Control knob to Play-Record.

3. Adjust the Volume control to the desired listening level.

To Use An External Speaker or Earphone

1. Insert the external speaker or earphone into the Mon jack. The internal speaker of the recorder will then be disconnected. The external speaker or earphone can be used for playback only.

To Erase a Recording

In the Record position, any recording is automatically erased before a new one is put on the tape. To erase a recording without putting a new one on, follow the normal recording procedure, but set the Volume control fully counterclockwise.

To Edit and Splice Tape

NOTE: Since it is impossible to edit and splice one track without affecting the other, editing should be limited to one track only.

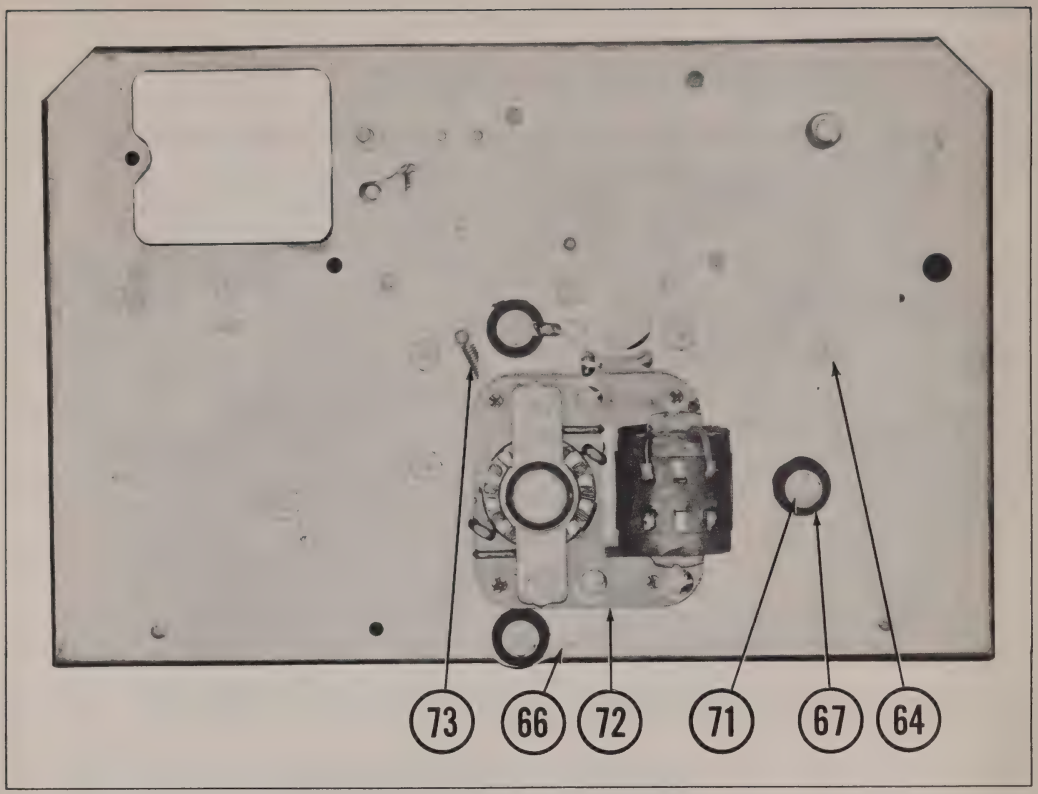


FIG.2 BOTTOM VIEW OF MECHANISM

1. Tape can be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements, etc., can be inserted between selections. Unused tape can be spliced for re-use.
2. For best results, cut the tape at a slight diagonal, join the ends with a butt joint, and fasten on the glossy side with splicing tape. Trim off any excess width.

DISASSEMBLY

To Remove the Mechanism From the Case

1. Pull off the Volume and Control knobs.
2. Pull off the plastic knob on the Quick Stop lever.
3. Unscrew the two Phillips head screws in the head cover. Remove the head cover.
4. Unscrew the four Phillips head screws in the top dress plate. Remove the top dress plate.
5. Unscrew the four Phillips head screws, two in the front and one on each side of the case.
6. Remove the AC cord clamp in the storage compartment.
7. Lift the unit slightly, and unsolder the speaker leads.
8. Lift unit from the case.
9. To reassemble, reverse Steps 1 through 8.

To Remove the Amplifier From the Tape Transport

1. Unsolder the head leads.
2. Unsolder the motor leads.
3. Remove the hex head nuts holding the amplifier to the tape transport.
4. Lift the amplifier away from the tape transport.
5. To reassemble, reverse Steps 1 through 4.

ADJUSTMENTS

Take-up Spindle Clutch

To adjust the take-up spindle clutch, loosen the set screw in the reel cup. Move the spindle up or down to tighten or loosen tension spring (3). (Make this adjustment with a tape known to be good.)

Head

Thread an alignment tape on the recorder. Then adjust screws (41A) for maximum output.

CLEANING

Tape guides (75), pressure pads (35), play-record head (34), pressure roller (32), and the capstan pick up residue from the tape as it passes these parts. Clean them with a commercial head solvent.

LUBRICATION

Lubrication applied during manufacture should last for a long time. However, lubrication may be required if the unit is operated frequently or at high temperatures, or after a part has been replaced.

TROUBLE CHART

Symptom	Cause	Remedy
Drive idler wheel (20) does not engage the motor shaft.	1. Tension spring (26) disconnected or broken.	1. Connect or replace tension spring (26).
Drive idler wheel (20) does not disengage the motor shaft.	1. Drive wheel actuating lever spring (7) disconnected or broken.	1. Connect or replace spring (7).
No rewind.	1. Reverse belt (47) off the drive pulley or broken.	1. Put reverse drive belt (47) back on pulley, or replace belt if broken.
No takeup in Play or Record.	1. Tension spring (26) disconnected or broken.	1. Connect or replace tension spring (26).
	2. Take-up clutch misadjusted.	2. See "Clutch Adjustment".
Pressure roller does not contact the capstan properly.	1. Pressure roller tension spring (36) disconnected or broken.	1. Connect or replace spring (36).
Pressure pads do not hold the tape against the tape guide and head properly.	1. Pressure pad tension spring (54) broken or disconnected.	1. Connect or replace spring (54).
No record or playback.	1. Defective component in amplifier.	1. Check amplifier per schematic. Replace any defective components.
	2. Defective play-record head (34).	2. Replace play-record head (34).

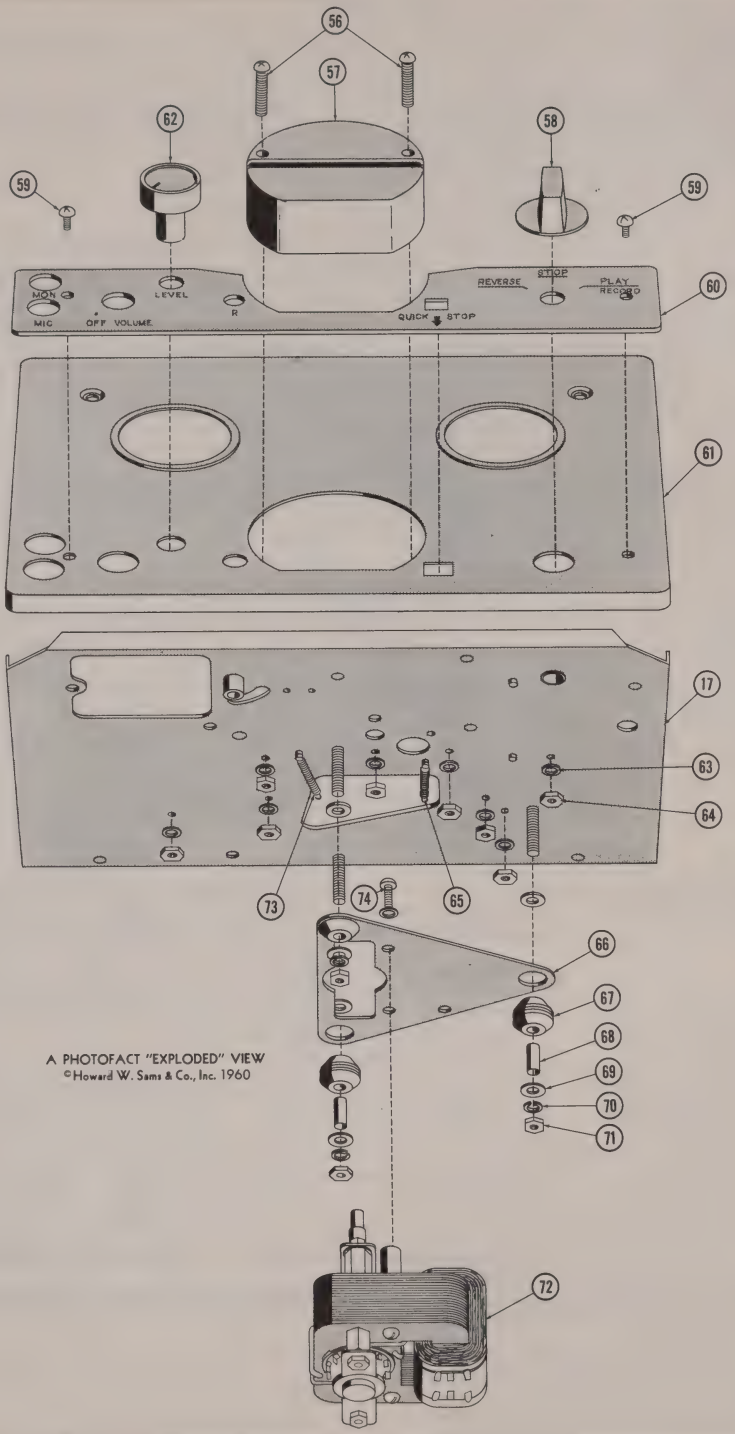
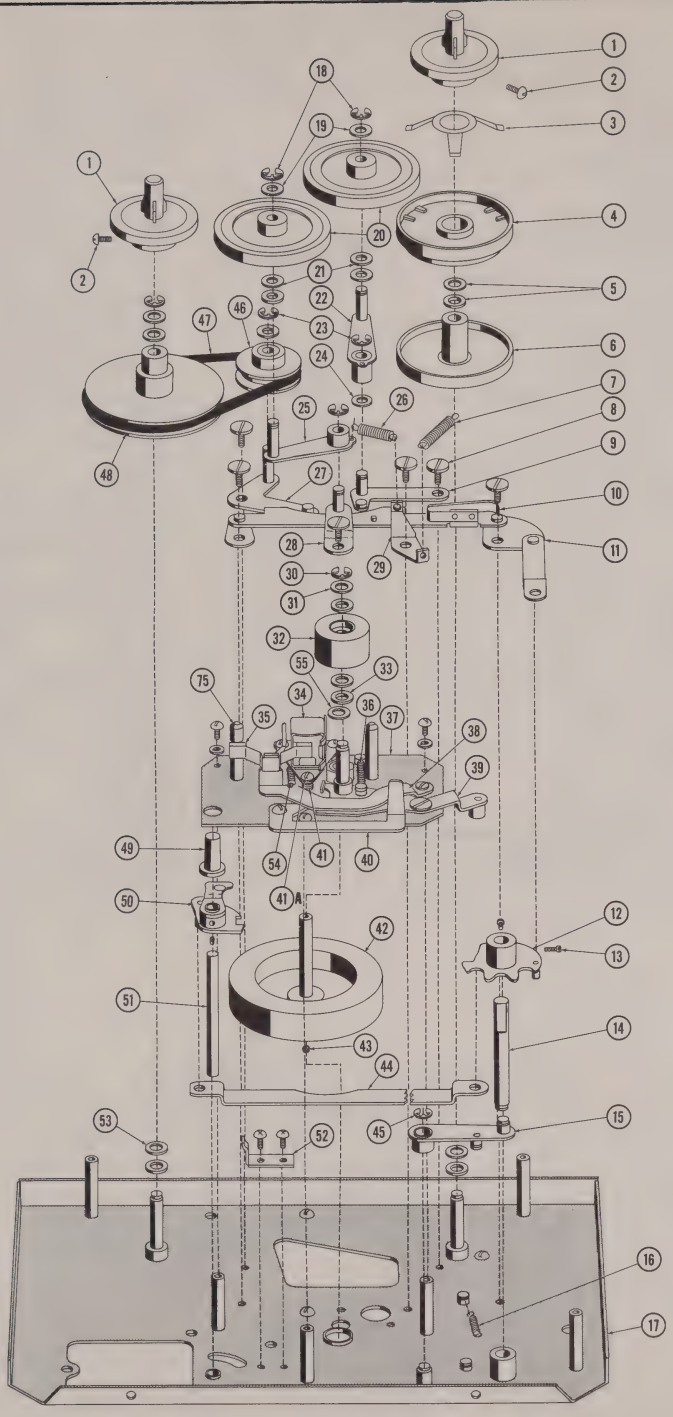


FIG.3A EXPLODED VIEW OF PARTS



A PHOTOFACT "EXPLODED" VIEW
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FIG.3B EXPLODED VIEW OF PARTS

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1		Reel Cup
2		Set Screw
3		Tension Spring
4		Clutch Plate
5		Washers
6		Right Reel Plate
7		Drive Wheel Actuating Lever Spring
8		Screw
9		Takeup Drive Idler Lever
10		Brake Spring
11		Play-Record-Reverse Actuating Lever
12		Control Cam
13		Set Screw
14		Control Shaft
15		Control Cam Locking Lever
16		Tension Spring
17		Mounting Plate
18		"C" Washers
19		Nylon Washers
20		Drive Idler Wheels
21		Fiber Washers
22		Takeup Drive Idler Lever
23		"C" Washers
24		Fiber Washer
25		Drive Idler Lever
26		Tension Spring
27		Reverse Lever
28		Drive Idler Mounting Lever
29		Drive Idler Actuating Lever
30		"C" Washer
31		Fiber Washer
32		Pressure Roller
33		Fiber Washer
34		Play-Record Head
35		Pressure Pads
36		Pressure Roller Tension Spring
37		Head Mounting Plate
38		Pressure Pad Actuating Lever
39		Pressure Roller Actuating Lever
40		Quick Stop Lever
41		Play-Record Head Tension Spring
41A		Azimuth Adjust Screw
42		Flywheel-Capstan Ass'y.
43		Ball Bearing
44		Record Lock Actuating Lever
45		"C" Washer
46		Reverse Drive Pulley
47		Reverse Drive Belt
48		Left Reel Plate
49		Record Lock Button
50		Record Lock Cam
51		Record Lock Shaft
52		Record Lock Stop
53		Washers
54		Pressure Pad Tension Spring
55		Washer
56		Head Cover Screws
57		Head Cover
58		Control Knob
59		Dress Plate Mounting Screws
60		Escutcheon
61		Dress Plate
62		Off-Volume Control Knob
63		Lockwasher
64		Hex Nut
65		Tension Spring
66		Motor Mounting Plate
67		Grommet
68		Spacer
69		Washer
70		Lockwasher
71		Hex Nut
72		Motor
73		Tension Spring
74		Motor Mounting Screw
75		Tape Guide

AMP PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Preamplifier	12AV6
V2	AF Amplifier	12BA6
V3	Output	30A5
V4	Rectifier	35W4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FUJIYA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	150		AFH3-10	C0090	FP311.4	TMT-9	TVL-3438	
B	■40	150							
C	▲40	150							
C2	5	150		SRE150V5	NLW5-150	TT150X5	TD-4-150	TE-1504	
C3	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	①
C4	5	150		PRS1400	NLW5-150	TT150X5	TD-4-150	TE-1504	
C5	25	25		XPP-25025	NLW20-25	TT25X25	ML30-25	TE-1207	

① Some versions may use 25mfd@ 6V in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-625	6TM-D5
C7	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-625	6TM-D5
C8	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-625	6TM-D5
C9	150		SI 150	D6-151	L10T15	CCD-151	GP315	10TS-T15
C10	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C11	.02 400V		P488N-02	DD-203	CUB4S2	4DP-2-203	GEM-412	4TM-S2

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FUJIYA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	34.06A	AB-60				Volume
B	Shaft			AK-29				
C	Switch			KR-3				Power Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed

ITEM No.	RATING	REMARKS
R2	2meg	
R3	250K	
R4	150K	
R5	300K	
R6	2000Ω	
R7	500K	

ITEM No.	RATING	REMARKS
R8	2meg	
R9	150Ω	
R10	50Ω	
R11	100Ω 1W	
R12	300Ω	
R13	10K	

ITEM No.	RATING	REMARKS
R14	150K	
R15	800K	
R16	150Ω 5W	
R17	20Ω	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA FUJIYA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	1800Ω	6-8Ω		22S86	A-2928	AU-603	A-3849①	22S86	S-53X①	

① Drill New Mounting Hole.

MISCELLANEOUS

ITEM No.	PART NAME	FUJIYA PART No.	NOTES
M1	Head		Erase
M2	Head		Record-Playback
M3	Motor		Drive

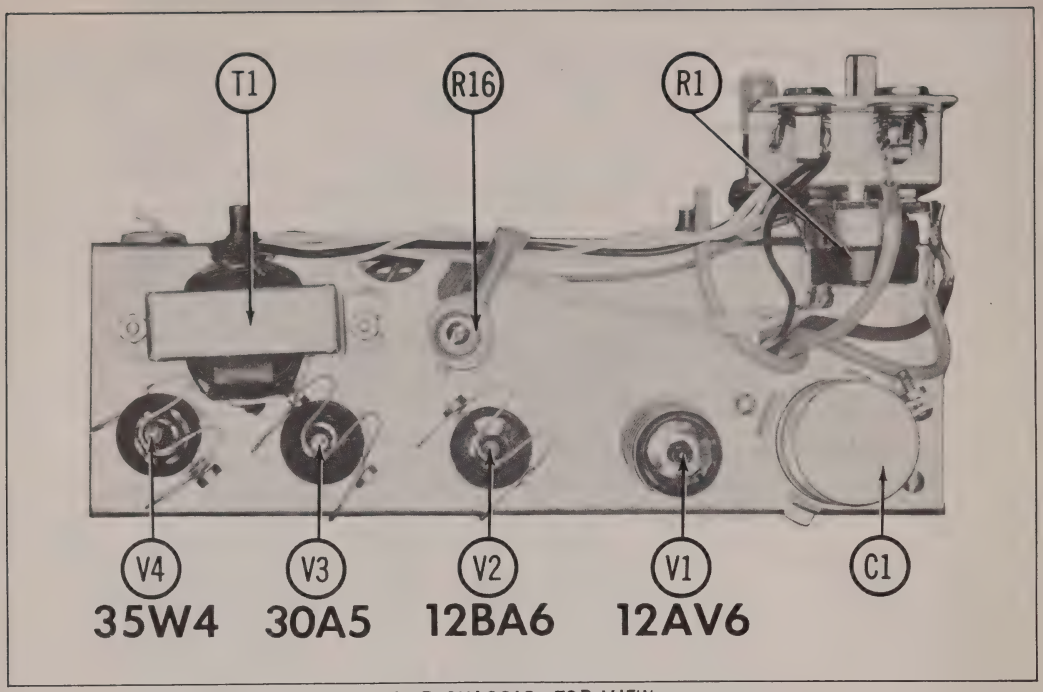
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

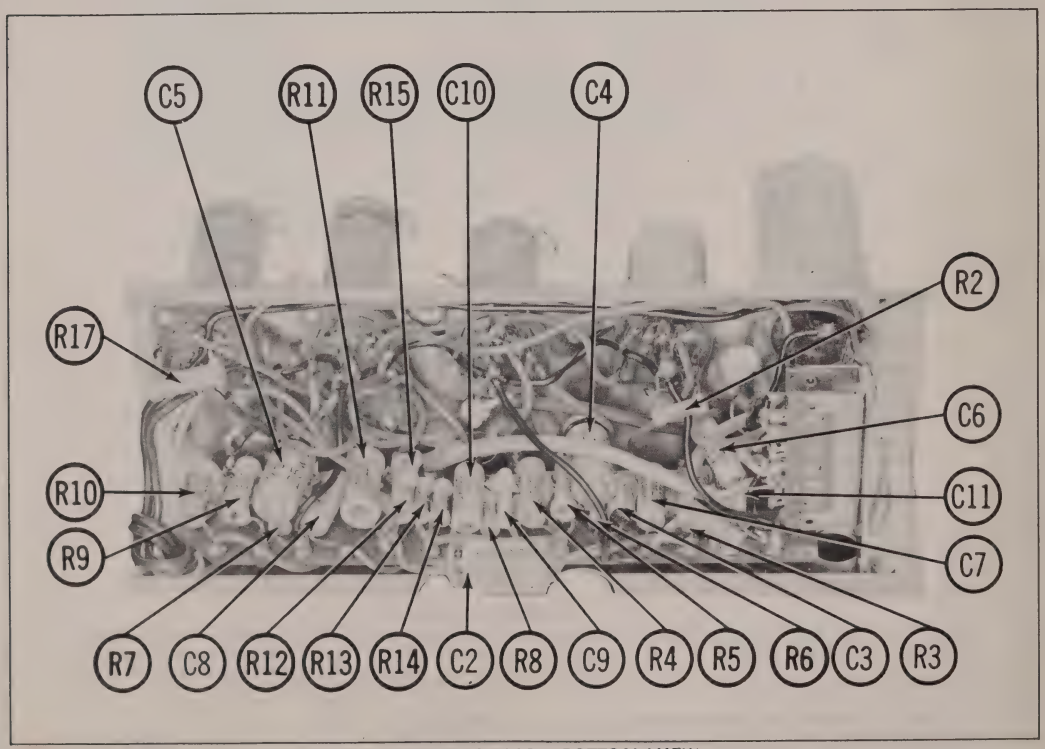
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401

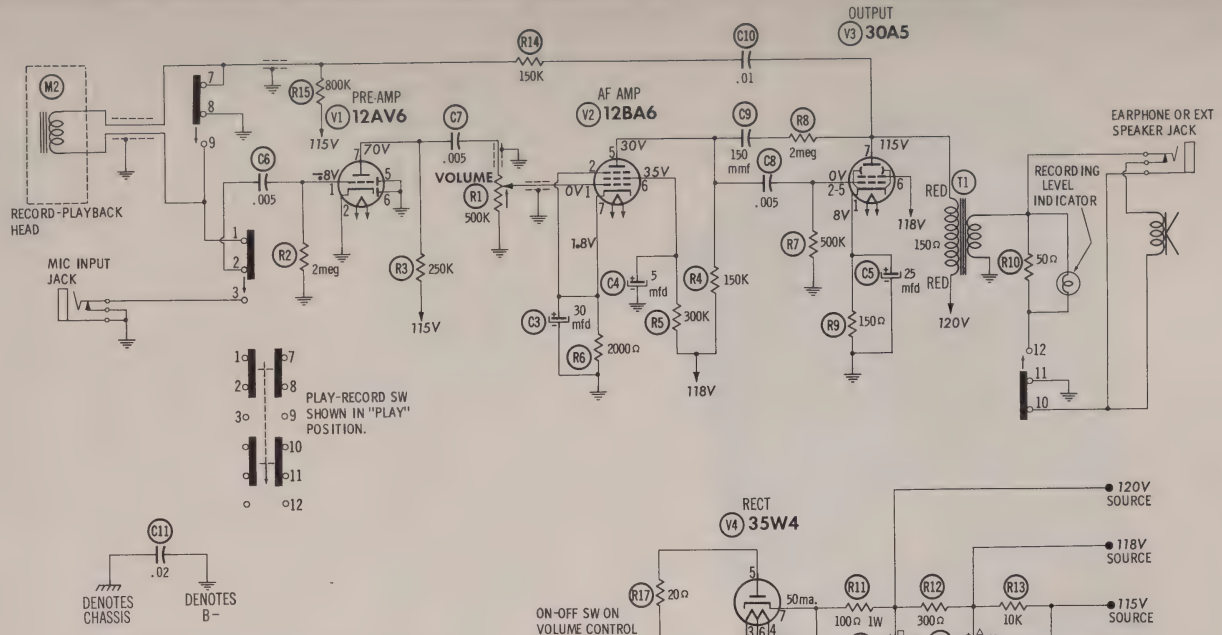
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)



AMP CHASSIS—TOP VIEW



AMP CHASSIS— BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AV6	2meg	0Ω	0Ω	12Ω	0Ω	0Ω	†260K
V2	12BA6	0Ω	2000Ω	24Ω	12Ω	†150K	†300K	2000Ω
V3	30A5	150Ω	500K	54Ω	24Ω	500K	†400Ω	†250Ω
V4	35W4	NC	TP	240Ω	205Ω	230Ω	260Ω	¶

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

† MEASURED FROM PIN 7 OF V4.

NC NO CONNECTION TP TIE POINT

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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FUJIYA CORDER MODEL EX-311

FUJIYA CORDER MODEL EX-311

PHOTOFACT® Folder

GROMMES MODEL 20LJ

GROMMES
MODEL 20LJ

GROMMES
MODEL 20LJ

TRADE NAME	Grommes Model 20LJ
MANUFACTURER	Precision Electronics, Inc., 9101 King Ave., Franklin Park, Illinois
TYPE SET	AC Operated 9 Tube Stereo Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 76 Watts, .7 Amp @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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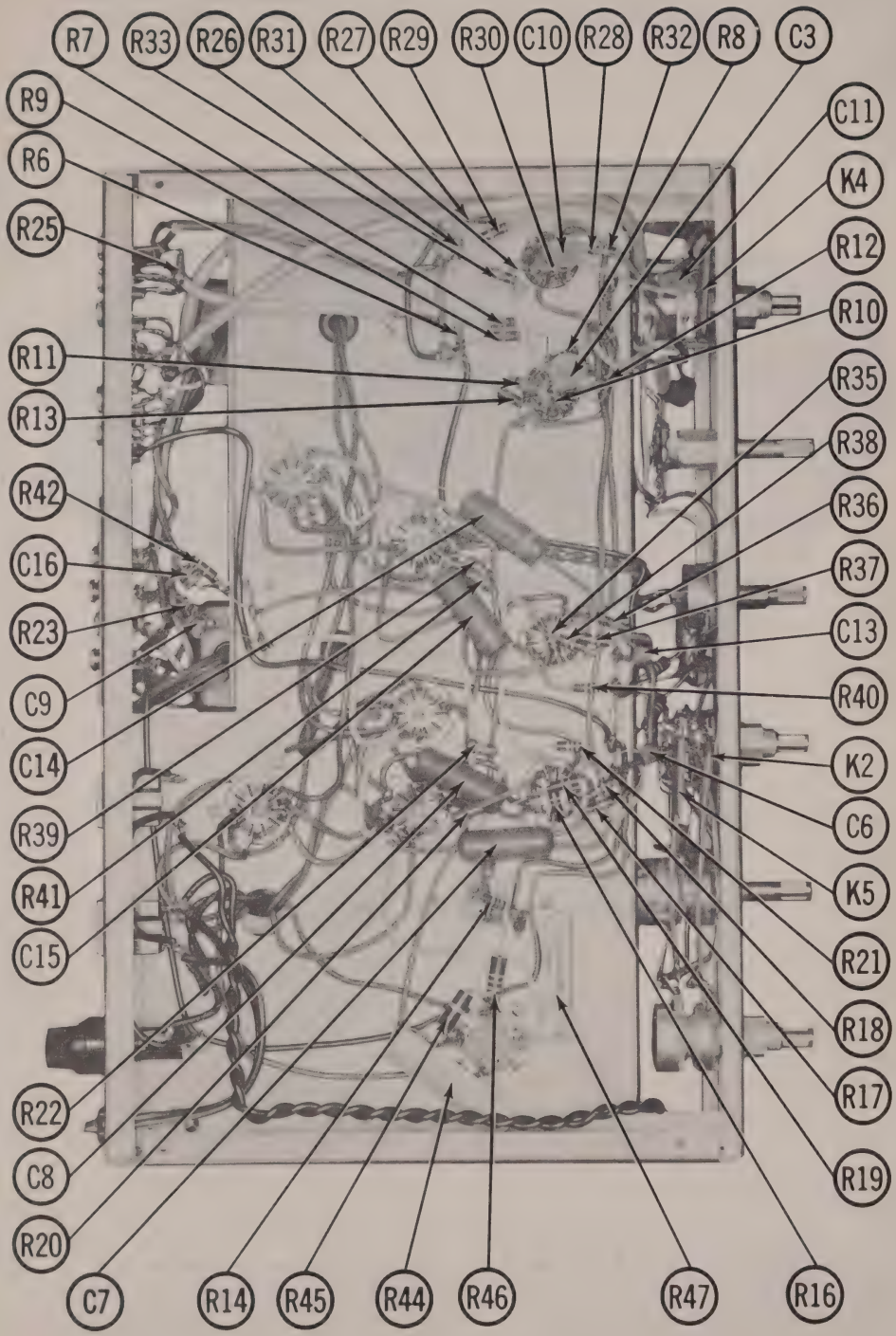


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

• CBS •	GENERAL ELECTRIC •	RAYTHEON •	SYLVANIA •

ITEM No.	USE	TYPE
V1	Channel A Pre Amp	ECC83/12AX7 (7025)*
V2	Channel A AF Amp - Phase Inv.	12AX7 (7025) *
V3	Channel A Output	6BQ5 (EL84) *
V4	Channel A Output	6BQ5 (EL84) *
V5	Channel B Pre Amp	ECC83/12AX7 (7025)*
V6	Channel B AF Amp - Phase Inv.	12AX7 (7025) *
V7	Channel B Output	6BQ5 (EL84) *
V8	Channel B Output	6BQ5 (EL84) *
V9	Rectifier	EZ81/6CA4

*Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	400		AFH4-78	D0640	FP429	TMQ-92	TVL-4732	
B	■30	350							
C	▲10	300							
D	50	25		AFH3-189-40	C1120	FP384.16	TMT-84	TVL-2708	
C2A	■10	250							
B	▲100	15							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C4	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C5	.047 200V	Note 1	P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C6	250		DI-250	DD-251	L10T25	CCD-251	GP325	10TS-T25
C7	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C8	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C9	100		S1100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C11	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C12	.047 200V	Note 1	P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C13	250		DI-250	DD-251	L10T25	CCD-251	GP325	10TS-T25
C14	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C15	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C16	100		S1100	DD-101	L10T1	CCD-101	GP310	10TS-T10

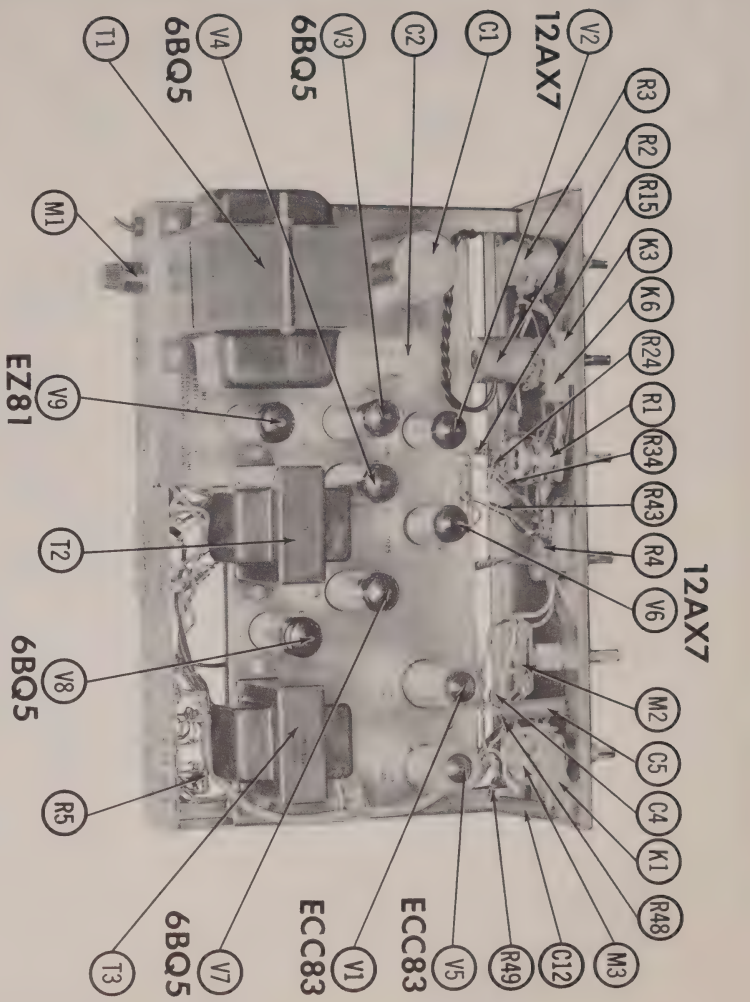
Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K *		LCK-500KS				FB55DT25	Loudness, Channel A
B	500K *						RU55DT25	Loudness, Channel B
C	Shaft						CS3500	
R2A	2meg		TCK-2MS-WS	B-76	AD47-2meg-Z		FA26A	Bass, Channel A
B	2meg			SR-76	Not Req.		RU26A	Bass, Channel B
C	Shaft			Not Req.	KSS-3		CS3500	
D	Switch			KR-1	SWE-12		US41	Power Off/On
R3A	2meg		TCK-2MS	B-76	AD47-2meg-Z		FA26A	Treble, Channel A
B	2meg			SR-76	Not Req.		RU26A	Treble, Channel B
C	Shaft			Not Req.	KSS-3		CS3500	
R4A	1meg		TCK-1M	B-69	A47-1meg-S	Q11-137	U54	Balance
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

* Taps @100K, 200K.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	2.2meg	
R6	47K	
R7	10K	Note 1
R8	100K	
R9	1000Ω	
R10	18K	
R11	1meg	
R12	100K	
R13	1000Ω	
R14	470Ω	
R15	100K	
R16	100Ω	
R17	10K	
R18	220K	
R19	220K	

ITEM No.	RATING	REMARKS
R20	220K	
R21	47K	
R22	270K	
R23	4700Ω	
R24	22K	
R25	2.2meg	
R26	47K	
R27	10K	Note 1
R28	100K	
R29	1000Ω	
R30	18K	
R31	1meg	
R32	100K	
R33	1000Ω	
R34	100K	

ITEM No.	RATING	REMARKS
R35	100Ω	
R36	10K	
R37	220K	
R38	220K	
R39	220K	
R40	47K	
R41	270K	
R42	4700Ω	
R43	22K	
R44	2500Ω 10W	
R45	1000Ω 1W	
R46	47K 1W	
R47	100Ω 7W	
R48	10K	Note 1
R49	10K	Note 1

Note 1. Not Used In Some Versions

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .7A	500 VCT @ .100A	6.3 VCT @ 5.2A	TP-19						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6000Ω CT	16Ω tap @ 8Ω, 4Ω	TO-10							
T3	6000Ω CT	16Ω tap @ 8Ω, 4Ω	TO-10							

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	GROMMES PART No.	REPLACEMENT DATA
K1	Input Coupling	800mmf, 2000mmf, 3000mmf, 33K, 100K, 100K, 3.3meg, 3.3meg	PC-1960	
K2	Treble Comp.	50mmf, 250mmf, 10000mmf, 10K, 22K, 470K	PC-1963	
K3	Bass Comp.	3000mmf, 5000mmf, 47K	PC-1962	
K4	Input Coupling	800mmf, 2000mmf, 3000mmf, 33K, 100K, 100K, 3.3meg, 3.3meg	PC-1960	
K5	Treble Comp.	50mmf, 250mmf, 10000mmf, 10K, 22K, 470K	PC-1963	
K6	Bass Comp.	3000mmf, 5000mmf, 47K	PC-1962	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GROMMES PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312 002 (3AG 2A 250V	342001	AGC 2	HKP

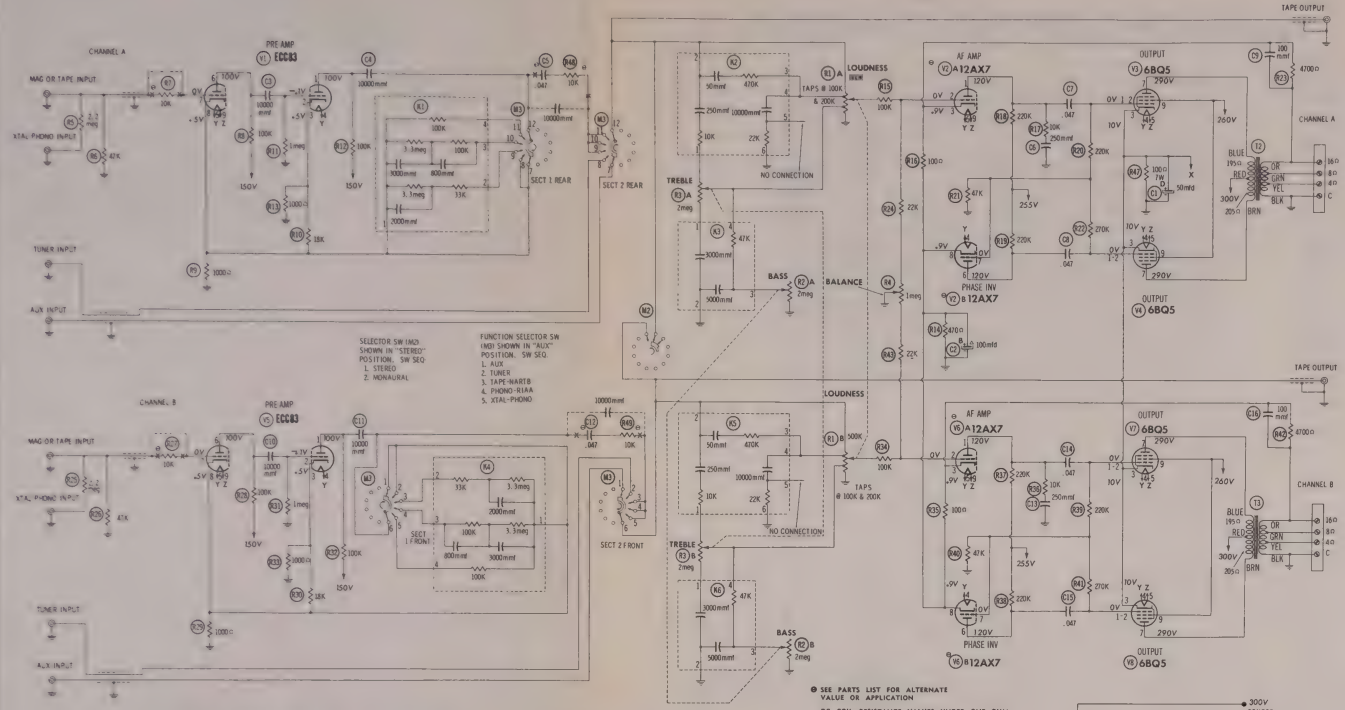
MISCELLANEOUS

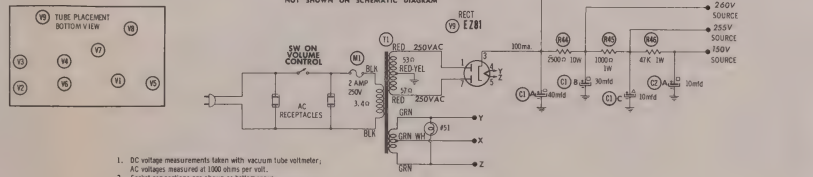
ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Switch		Function (Stereo - Monaural)
M3	Switch		Selector

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 (12AX7)	*150K	2meg	1000Ω	100Ω	100Ω	*150K	57K	1000Ω	100Ω
V2	12AX7	*220K	90K	900Ω	200Ω	100Ω	*220K	47K	400Ω	100Ω
V3	6BQ5	270K	270K	100Ω	100Ω	100Ω	NC	*195Ω	NC	*250Ω
V4	6BQ5	320K	320K	100Ω	100Ω	100Ω	NC	*205Ω	NC	*250Ω
V5	ECC83 (12AX7)	*150K	2meg	1000Ω	100Ω	100Ω	*150K	57K	1000Ω	100Ω
V6	12AX7	*220K	90K	900Ω	200Ω	100Ω	*220K	47K	400Ω	100Ω
V7	6BQ5	270K	270K	100Ω	100Ω	100Ω	TP	*195Ω	NC	*250Ω
V8	6BQ5	320K	320K	100Ω	100Ω	100Ω	TP	*205Ω	NC	*250Ω
V9	EZ81 (5Y3)	5Ω	NC	1	100Ω	100Ω	NC	5Ω	NC	TP

1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
* MEASURED FROM PIN 3 OF V9.
NC NO CONNECTION
TP TIE POINT

@ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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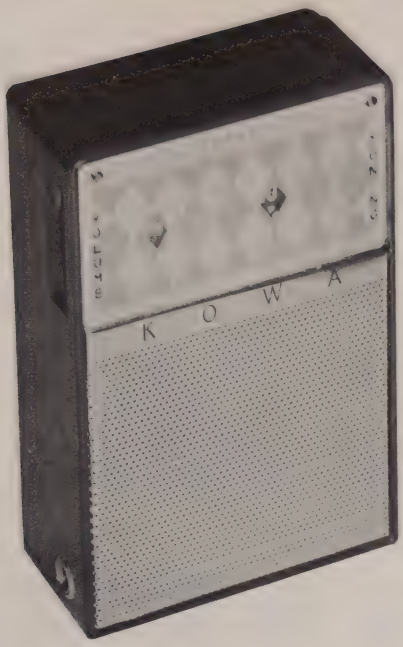
GROMMES
MODEL 20LJ

PHOTOFACT® Folder with CIRCUITRACE®

KOWA
MODEL KT-31

KOWA
MODEL KT-31



KOWA
MODEL KT-31

TRADE NAME	Kowa Model KT-31
SUPPLIER	Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N.Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE-BROADCAST 535-1650 KC	RATING 4MA @ 9 Volts DC (No signal, minimum volume) 5MA @ 9 Volts DC (Signal, normal volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2. . . . . GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

A3, A4 . . . . . GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298
WALSCO #2515, 2516, 2518, 2519, 2525, 2541

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Loop	455 KC (400∿ mod)	Tuning gang fully open	Across voice coil	A1, A2	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output
2	"	1650 KC	"	"	A3	"
3	"	1400 KC	Tune to 1400KC signal	"	A4	"
4	"	600 KC	Tune to 600KC signal	"	A5	Adjust for maximum output while rocking tuning gang.

SET490 FOLDER 9

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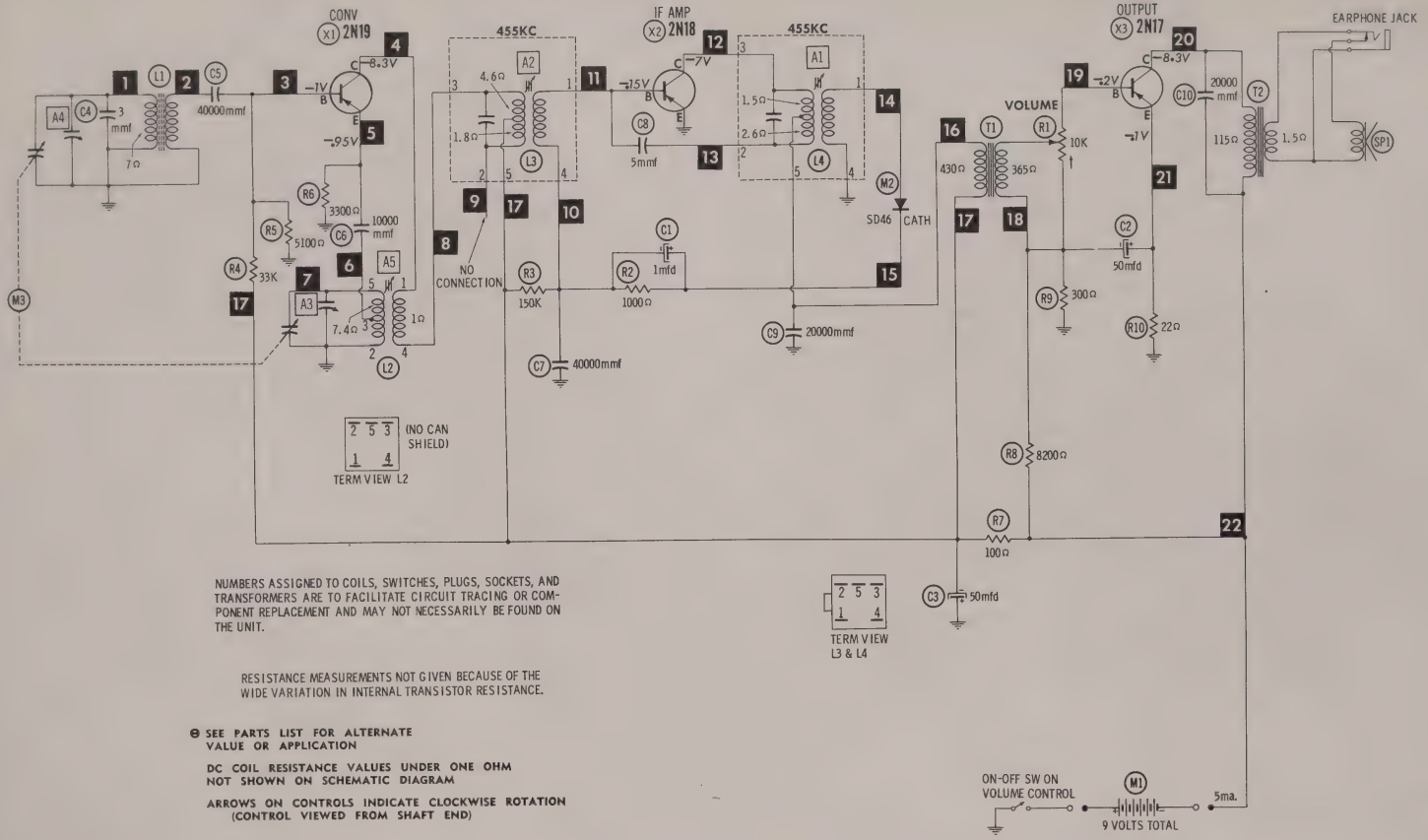
JF818



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

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KOWA MODEL KT-31

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N219	Converter		2N219	2N486		PNP
X2	2N218	IF Amplifier		2N218	2N484	2N218	PNP
X3	2N217	Output		2N217	2N631	2N217	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	KOWA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	1	6		XPP6001	NLW1-50	TT12X1	ML1-6	TE-1080	
C2	50	10		XPP10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C3	50	10		XPP10050	NLW50-10	TT10X50	ML50-15	TE-1119	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	3		NPO-DI3.0	DTZ-3R3	C10V3C	CCTO-3R3	CND-533	10TCC-V33	
C5	40000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10	
C6	10000								
C7	40000								
C8	5		NPO-DI5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50	
C9	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20	
C10	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KOWA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	10K	1/4		B16-216				Volume and Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	1000Ω	
R3	150K	
R4	33K	

ITEM No.	RATING	REMARKS
R5	5100Ω	
R6	3300Ω	
R7	100Ω	

ITEM No.	RATING	REMARKS
R8	8200Ω	
R9	300Ω	
R10	22Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		KOWA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	1st IF Trans							
L4	2nd IF Trans							

PRINTED BOARD

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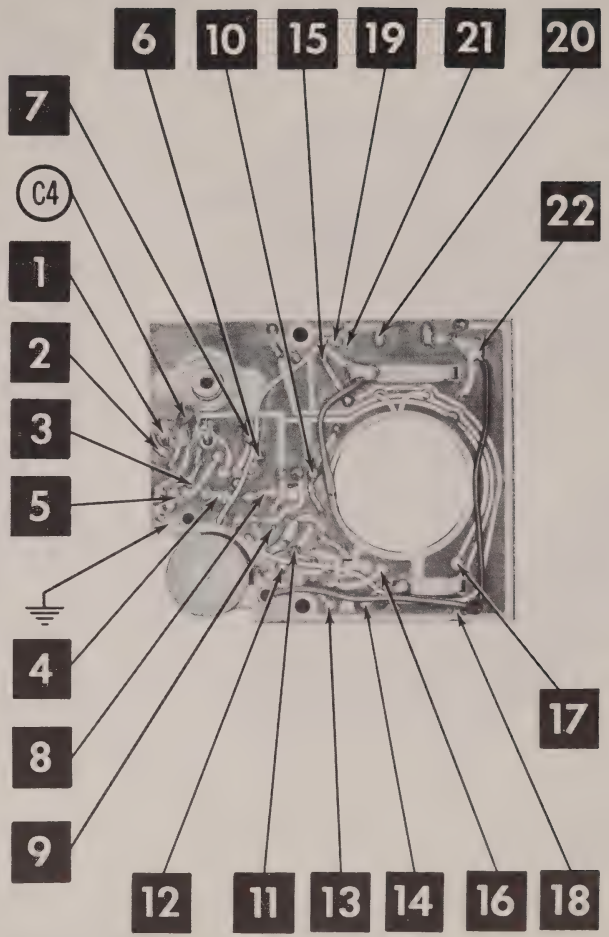


PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	KOWA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1, 2	1	TRT11B	TR-39			TR-39		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	KOWA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	800Ω	6-8Ω	TRT6Y	TR-104 ①			TA-26	TR-104 ①		① Tape Center Tap

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	KOWA PART No.	QUAM PART No.	
SP1	2"	PM	6-8Ω	P-200		

BATTERIES

ITEM No.	VOLTAGE	KOWA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M-1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		KOWA PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD46		1N60	1N60	1N60	Detector (Pigtail)

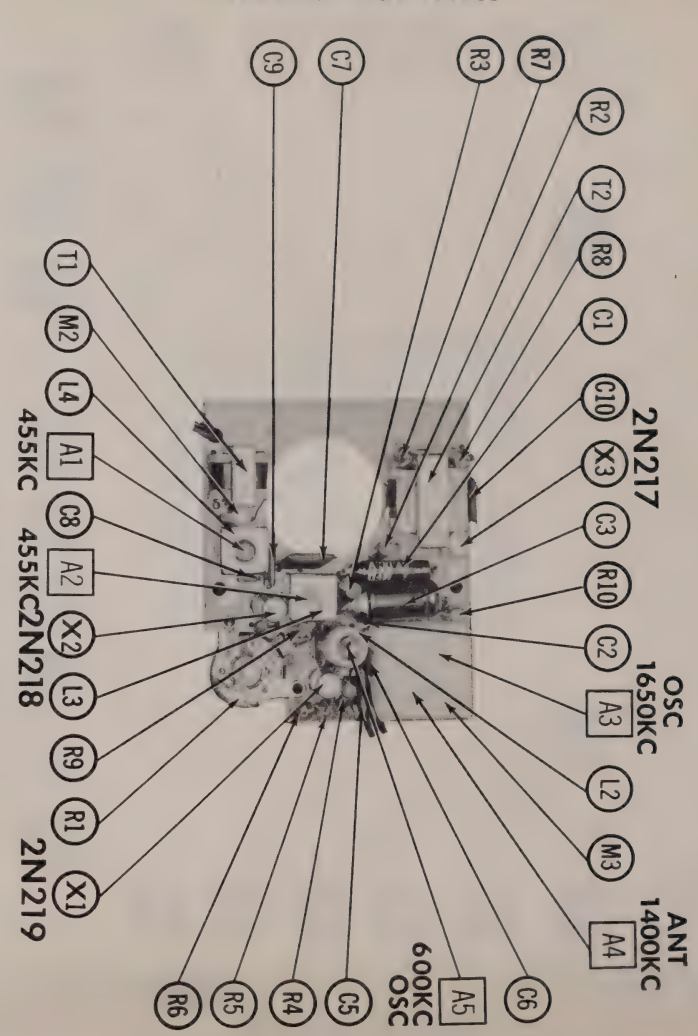
MISCELLANEOUS

ITEM No.	PART NAME	KOWA PART No.	NOTES
M3	Tuning Cap		2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

MOTOROLA MODELS SK32W, SK33W, SK35W (Ch. HS-775, HS-776, HS-778)

MOTOROLA MODELS SK32W, SK33W, SK35W (Ch. HS-775, HS-776, HS-778)

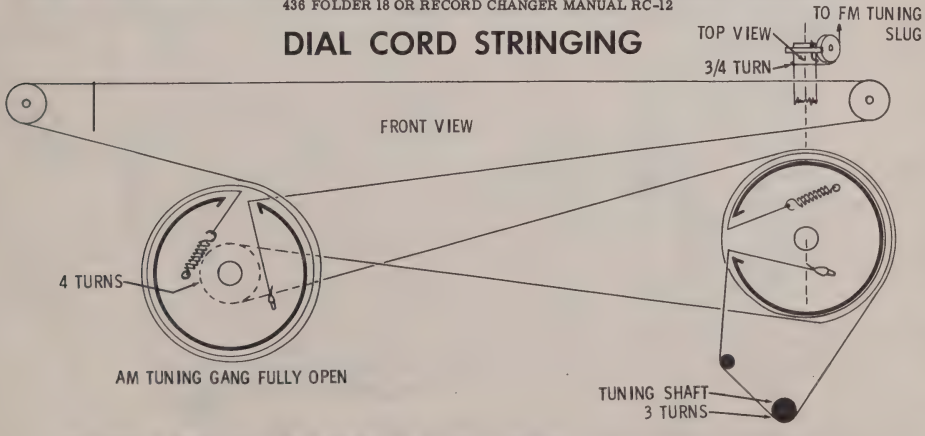
MODEL SK32W

MOTOROLA MODELS SK32W, SK33W, SK35W (Ch. HS-775, HS-776, HS-778)

TRADE NAME	Motorola Models SK32W, SK33W (Tuner Ch. HS-776, Amp. Ch. HS-775) SK35W (Tuner Ch. HS-776, Amp. Ch. HS-778)		
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois		
TYPE SET	AC Operated 10 Tube FM-AM Tuner-Stereo Preamplifier and 7 Tube Stereo Amplifier With 4 Speed Automatic Record Changer		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	140 Watts, 1.3 Amp. @ 117 Volts AC (Less Motor)
TUNING RANGE	BROADCAST 535-1620KC	FREQ. MOD.	88-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER VM24RC OR VM29RC - SEE SIMILAR V-M1201 - PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

DIAL CORD STRINGING



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KN034

SET 490 FOLDER 10

AM ALIGNMENT INSTRUCTIONS

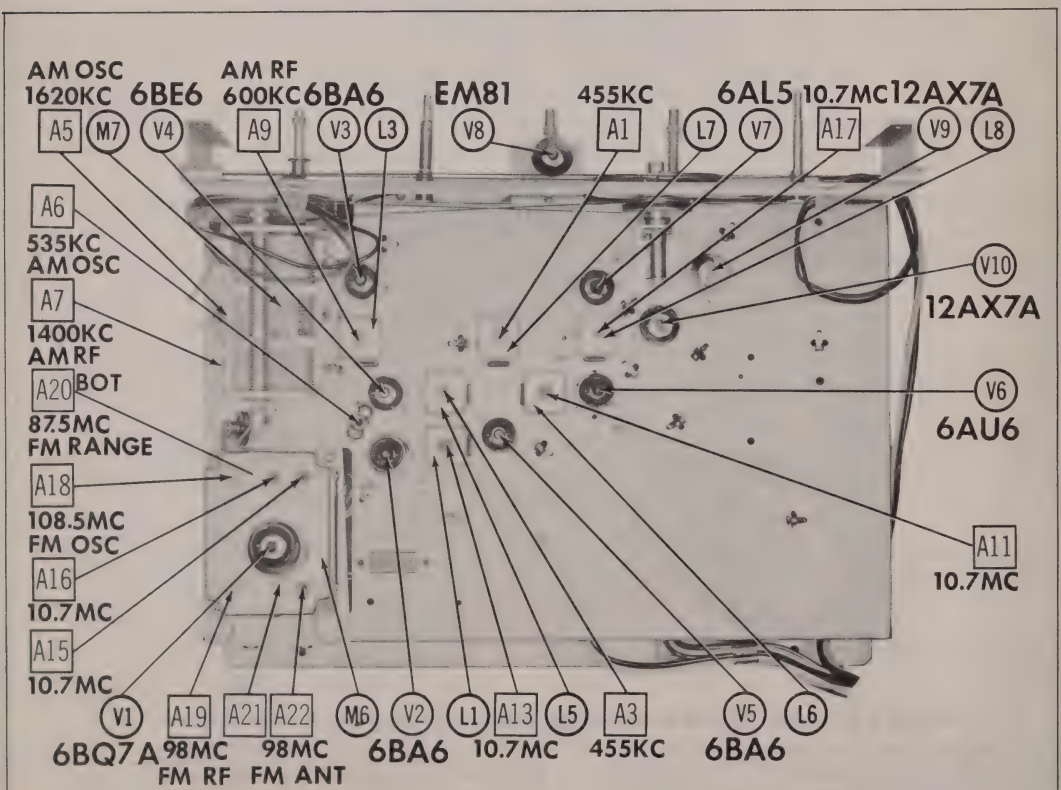
ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Set the Loudness control fully clockwise. Set Bass and Treble controls fully counterclockwise.
Use only enough generator output to provide a usable indication.
Suggested Alignment Tools:

A1 thru A4, A6, A9, A18, A19, A21 ..	GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989 WALSCO #2515, 2531, 2532
A5, A7, A8, A20	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A10, A17	GENERAL CEMENT #5097, 8727 WALSCO #2515
A11 thru A14	GENERAL CEMENT #8607, 9291, 9294 WALSCO #2520, 2522, 2523, 2524, 2534, 2537
A5, A16, A22	GENERAL CEMENT #8282, 8606, 8606-L, 9091 WALSCO #2526, 2541, 2542, 2543, 2544

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Conv. Low side to chassis.	455KC (400% Mod.)	(AM) Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	535KC	Tuning gang fully closed	"	A6	Adjust for maximum output. Repeat steps 2 and 3.
4.	"	1400KC	Tune to 1400KC signal	"	A7, A8	Adjust for maximum output.
5.	"	600KC	Tune to 600KC signal	"	A9	Adjust for maximum output. Repeat steps 4 and 5.



CHASSIS— TOP VIEW

FM ALIGNMENT INSTRUCTIONS

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Across FM antenna terminals.	10.7MC (Unmod.)	(FM) Point of non-interference	DC probe to point (A). Common to chassis.	A10, A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.
7.	"	"	"	DC probe to point (B). Common to chassis.	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	Across FM antenna terminals.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. Amp. to point (A). Low side to chassis.	A10, A11, A12, A13, A14, A15, A16	Disconnect stabilizing capacitor C3. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C3.
7.	"	"	"	Vert. Amp. to point (B). Low side to chassis.	A17	Adjust to place marker at the center of crossover lines similar to Fig. 2 . SLIGHTLY retouch A10 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

Before starting and after completion of FM RF Alignment, check receiver for oscillations (howls, squeels, motorboating loss of signal, etc.). If oscillations are present, perform step 11.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	Across FM antenna terminals with 120Ω in each lead.	108.5MC (Unmod.)	(FM) Tuning gang fully open	DC probe to point (A). Common to chassis.	A18	Adjust for maximum deflection.
9.	"	98MC	Tune to 98MC signal	"	A19	"
10.	"	87.5MC	Tuning gang fully closed	"	A20	Adjust for maximum deflection. Repeat steps 8 and 9.
11.	Check for oscillations and if present, turn A22 counterclockwise as far as possible to prevent overloading; then adjust A21 until oscillation ceases, consistent with maximum sensitivity.					
12.	Across FM antenna terminals with 120Ω in each lead.	98MC	Tune to 98MC signal	DC probe to point (A). Common to chassis.	A22	Adjust for maximum deflection. Repeat steps 8 and 9.

FIG. 1

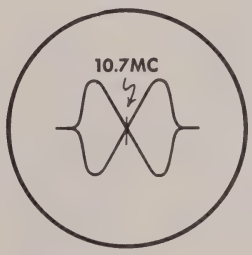


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V1	FM RF Amp.-FM Conv.	6BQ7A
V2	1st FM IF Amplifier	6BA6
V3	AM RF Amplifier	6BA6
V4	AM Converter	6BE6
V5	2nd FM-1st AM IF Amp.	6BA6
V6	3rd FM IF Amplifier	6AU6
V7	Ratio Detector	6AL5
V8	Tuning Indicator	EM81/6DA5
V9	Left Channel AF Amp.	12AX7A
V10	Right Channel AF Amp.	12AX7A
V11	Left Channel AF Amp.-Right Channel AF Amp.	12AX7A
V12	Left Channel Output	EL84/6BQ5
V13	Center Channel AF Amp.-Phase Inverter	12AX7A
V14	Center Channel Output	EL84/6BQ5
V15	Center Channel Output	EL84/6BQ5
V16	Right Channel Output	EL84/6BQ5
V17	Rectifier	5U4GB

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	400	23K645404	AFH4-57-75	C0350	FP421.8	TMT-40	TVL-3787	
B	■40	400			BBR100-25		TD-100-25	TVA-1207	
C	▲30	400							
D	100	25							
C2	10	400	23B642409	PRS1720	BR1045	TC72	TD-10-450	TVA-1705	
C3	8	50	23A638536	PRS1405	BBR8-150	TC41	TC-8-150	TVA-1405	
C4	5	10NP	23B643970	NP-PRS7405	BBR10-25 †	TCN105		TVANS-1110 *	
C5	5	10NP	23B643970	NP-PRS7405	BBR10-25 †	TCN105		TVANS-1110 *	

† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

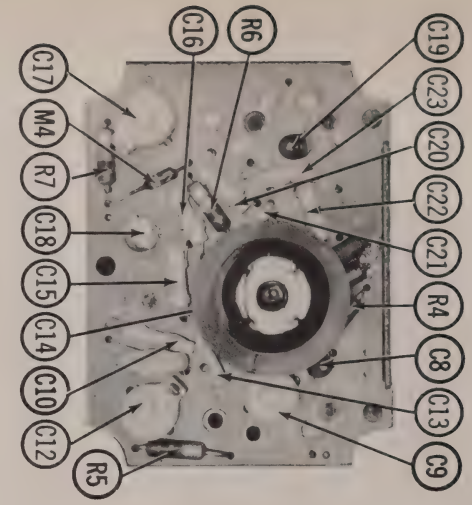
FIXED CAPACITORS

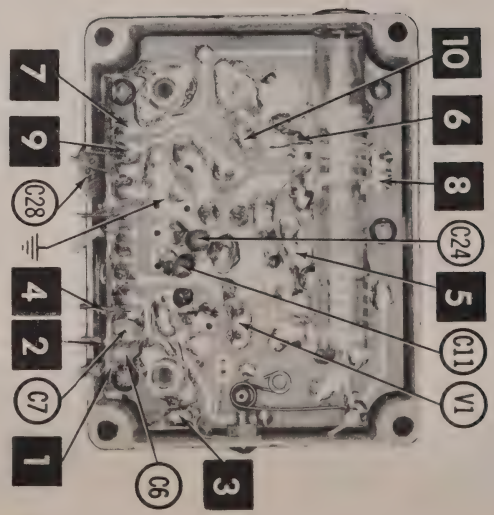
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	10 N750		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCC-Q10
C7	10 N750		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCC-Q10
C8	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C9	3-8 P33	#20K646183						
C10	200 N750 5%			TCN-200	C10T2U		CN7-320	10TCU-T20
C11	1000		BPD-001		BYA10D1	CCD-102	GP210	5HK-D10
C12	4-20 N470	#20K646185				*		
C13	36 N150 5%	#21K646186				*		
C14	36 N150 5%	#21K646186				*		
C15	10 N150	#21K646187				*		10TCP-Q10
C16	10 N150	#21K646187				*		10TCP-Q10
C17	3-8 P33	#20K646183						
C18	1 P100	#21K646188				*		
C19	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C20	12 N150 2.5%	#21K646189				*		
C21	100 N750 2%	#21K646191		TCN-100				
C22	15 N150 2%	#21K646190				*		
C23	12 N150 2.5%	#21K646189				*		
C24	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C25	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P1
C26	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C27	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C28	27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C29	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C30	.05 200V		P288N-05	DD-503	CUB2S5	4DP-3-503	GEM-415	2TM-S5
C31	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C32	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C33	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C36	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-47	CN7-447	10TCU-Q47
C37	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C38	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33

A Howard W. Sams CIRCUITRACE® Photo

FM RF SUBCHASSIS





ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C39	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C41	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C42	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C43	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C44	2000 10%		DI-2000		1R5D2	CCD-202	GP220	10TS-D20
C45	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C46	56 N750 10%			TCN-56	C10Q56U	CCTN-560	CN7-456	10TCU-Q56
C47	.02 200V		P288N-02	DD-203	CUB2S5	4DP-2-203	GEM-412	2TM-S2
C48	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP103	5HK-S10
C49	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C50	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C51	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C52	2000 10%		DI-2000		1R5D2	CCD-202	GP220	10TS-D20
C53	.02 200V		P288N-02	DD-203	CUB2S2	4DP-2-203	GEM-412	2TM-S2
C54	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C55	.02 200V		P288N-02	DD-203	CUB2S2	4DP-2-203	GEM-412	2TM-S2
C56	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C57	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C58	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C59	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C60	2000 10%		DI-2000		1R5D2	CCD-202	GP220	10TS-D20
C61	.02 200V		P288N-02	DD-203	CUB2S2	4DP-2-203	GEM-412	2TM-S2
C62	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C63	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C64	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C65A	2000	)	BPD-2X002	DD3-202*	BYD6DD2	CCD-202	B2X220	5HK-2D20
B	2000	)				CCD-202		
C66	2700 10%		DI-2700		PM6D3	CCD-272	GEM-1623	10TS-D27
C67	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C68	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C69	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C70	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C71	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C72	3300 10%		DI-3300	DD-332	PM6D33	CCD-332	JL-233	10TS-D33
C73	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C74	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C75	2700 10%		DI-2700		PM6D3	CCD-272	GEM-1623	10TS-D27
C76	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C77	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C78	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10

Motorola Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg *		18K643896					Loudness, Left Channel
B	1meg *							Loudness, Right Channel
R2A	2meg		18B642126	B-76	AD47-2meg-Z		FA26A	Treble, Left Channel
B	2meg			SR-76	Not Req.		RU26A	Treble, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	
R3A	68K		18C645448					Balance
B	2meg							Bass, Left Channel
C	2meg							Bass, Right Channel
D	Switch							Power On-Off

* Taps ⓐ 100K & 500K.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	22K	
R5	1000Ω	
R6	220K	
R7	1meg	
R8	3300Ω 1W	
R9	330K	
R10	1000Ω	
R11	150Ω	
R12	100K	
R13	390K	
R14	3, 3meg	
R15	100K	
R16	10K 1W	
R17	68K	
R18	22K	
R19	3900Ω 1W	
R20	82Ω	
R21	1meg	
R22	100K	
R23	10K	
R24	1800Ω 5W	
R25	82Ω	
R26	68Ω	
R27	470K	
R28	1500Ω 1W	
R29	1000Ω	
R30	6800Ω	
R31	6800Ω	
R32	68K	
R33	1meg	
R34	1meg	
R35	1meg	
R36	680K	Note 1

RESISTORS (cont)

ITEM No.	RATING	REMARKS
R37	47K 1W	
R38	820Ω	
R39	180K	
R40	22K	
R41	100K	
R42	560K	
R43	56K	
R44	56K	
R45	1000Ω	
R46	680K	Note 1
R47	47K 1W	
R48	820Ω	
R49	180K	
R50	22K	
R51	100K	
R52	560K	
R53	56K	
R54	56K	
R55	4700Ω	
R56	1000Ω	
R57	390K	
R58	330K	
R59	2meg	
R60	120K	
R61	1200Ω	
R62	470K	
R63	150Ω 1W	

ITEM No.	RATING	REMARKS
R64	3300Ω	
R65	1, 5meg	
R66	120K	
R67	1800Ω	
R68	120K	
R69	1500Ω 2W	
R70	220K	
R71	220K	
R72	220K	
R73	100Ω	
R74	270K	
R75	100Ω	
R76	270K	
R77	150Ω 5W	
R78	15K	
R79	390K	
R80	330K	
R81	2meg	
R82	120K	
R83	1200Ω	
R84	470K	
R85	150Ω 1W	
R86	3300Ω	
R87	300Ω 5W	
R88	1500Ω 5W	

Note 1. Not used in some versions.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Loudness Comp.	50mmf, 100mmf, 2500mmf, 8000mmf, 33K, 100K	51K643898	
K2	Loudness Comp.	50mmf, 100mmf, 2500mmf, 8000mmf, 33K, 100K	51K643898	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MOTOROLA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	2nd FM IF Trans.	24K642112	16-3487	16-3487	FM-254	1463		
L2	Loop Ant.	1V645637 ①						
L3	AM RF Trans.	24C634251						
L4	AM Osc. Coil	24B638340	14-1073	14-1073	BC-393	69-OSC		
L5	1st AM IF Trans.	24K641654	16-6758	16-6758	BC-352	12-C1	RF-1	
L6	3rd FM IF Trans.	24K638647						
L7	2nd AM IF Trans.	24K642707	16-6770	16-6770	BC-355	12-C6		
L8	Ratio Det.	24C638488	17-3498	17-3498	FM-255	1465		

① Includes 1, 3-11mmf trimmer Part #20K645497.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ 1.3A	600 VCT ⓐ .180A	5V ⓐ 3A	25K645354J ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3 VCT ⓐ 7.3A									

① Alternate Part #25K645354.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5200Ω	6-8Ω	25C645452H①	26S46	A-2902	AU-604	A-3337	26S46	S-53X	
T3	6700Ω CT	6-8Ω	25C645453D②	24S16	A-2905	AU-609③	A-3880	24S16	S-57Z③	
T4	5200Ω	6-8Ω	25C645452H①	26S46	A-2902	AU-604	A-3337	26S46	S-53X	

① Alternate Part #25C645452.
② Alternate Part #25C645453.
③ Drill New Mounting Hole.

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	8"	PM	6-8Ω	50K645582 *	8A31Z8	* Models SK32W, SK33W
SP2	5 1/4"	PM	8-10Ω	50D645585 *	52A21Z8.6	‡ 2 used. Model SK35W
SP3	5"	PM	6-8Ω	50D645581 *	5A15Z7.8	
SP4	15"	PM	6-8Ω	50K642743 *	15A10L	
SP5	8"	PM	6-8Ω	50K645582 *	8A31Z8	
SP6	5 1/4"	PM	8-10Ω	50D645585 *	52A21Z8.6	
SP7	5"	PM	6-8Ω	50D645581 *	5A15Z7.8	
	15"	PM	6-8Ω	50C632259 ‡		
	6"x 9"	PM	6-8Ω	50K645791 ‡		
	5 1/4"	PM	14-16Ω	50K646000 ‡		
	5"	PM	14-16Ω	50K646010 ‡		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: MOTOROLA PART No. FUSE	MOTOROLA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	3A 125V S/B P/T	65A646112①		313003 (3AG 3A 125V) (S/B P/T)		MDV 3	

① Not used in early versions

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: MOTOROLA PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M2	59K645704①	13TB		26S				8TA4-S	N-8TA-S

① Red Body. Grey Body Part #59K642982.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA: MOTOROLA PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M3	47K645702 † ♦	W-103STDS †♦ or W-103STSS †	S-69XSD †♦ or S-69X †	† Jewel ♦ Diamond

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: MOTOROLA PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M4		48K646192	1N60	1N60	1N60	FM AFC Rect. (Pigtail)
M5	Clevite	48K636691	1N60	1N60	1N60	AM Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M6	FM Tuner	77D645456	(UT-347AFC), Complete
M7	Tuning Cap.	19B641650	3 Gang. (Ant. 22-330mmf, RF 12-182mmf, Osc. 20-83mmf)
M8	Switch	40D645478	Selector (7 position, rotary wafer type)
M9	Switch	40K643293	Radio-Phono (Includes Mounting Plate)

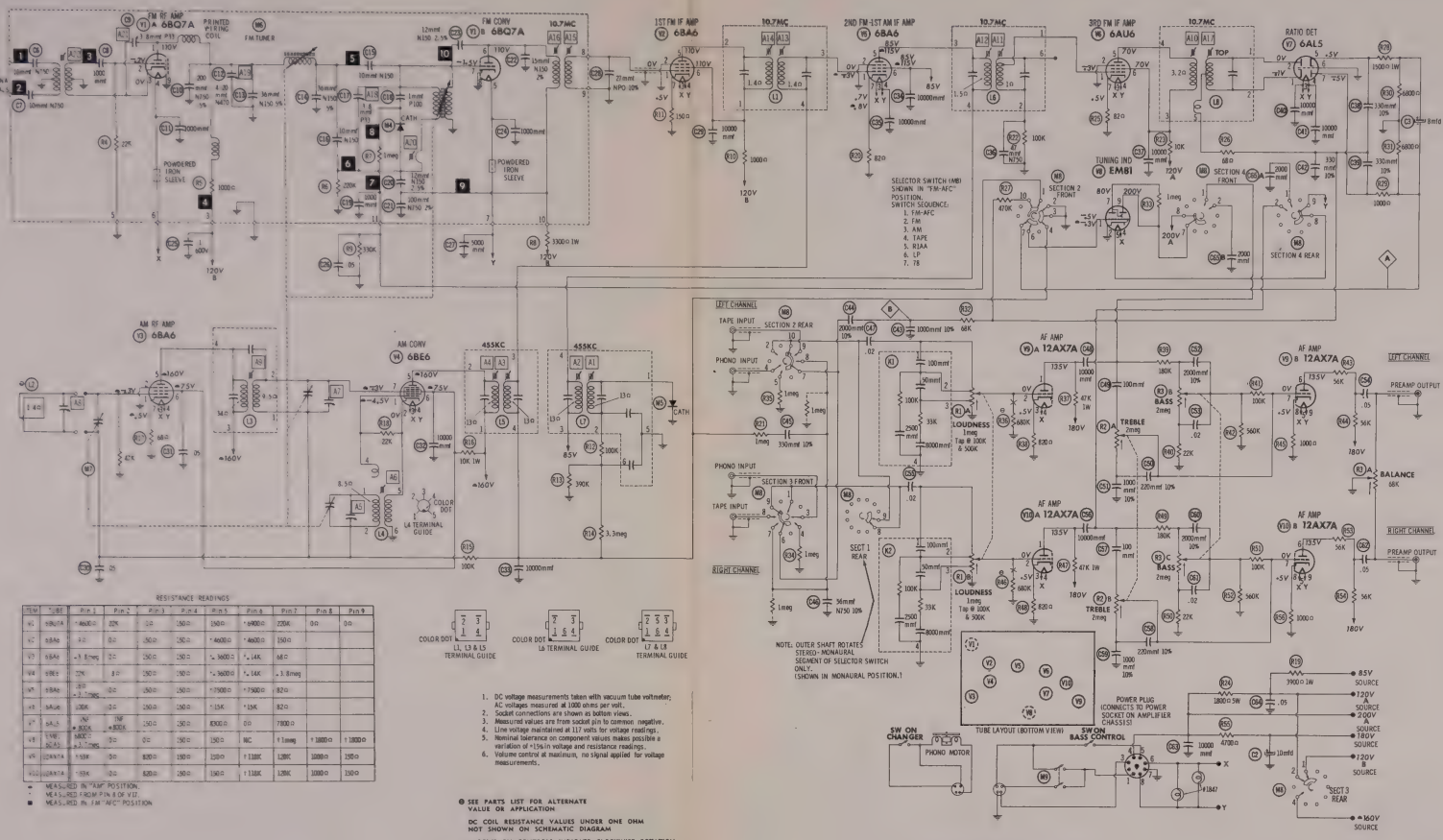
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36K645382	Tuning
Knob	36K645384	Loudness, Models SK32W, SK33W
Knob	36K645386	Loudness, Model SK35
Knob	36K645393	Off-On Bass, Models SK32W, 33W
Knob	36K645416	Off-On Bass, Model SK35W
Knob	36K645383	Treble, Models SK32W, 33W
Knob	36K645385	Treble, Model SK35W
Knob	36B642107	Balance, Stereo-Monaural
Knob	36K645394	Selector, Models SK32W, 33W
Knob	36K645417	Selector, Model SK35W
Dial Pointer	1K641665	
Dial Scale	34C645606	Models SK32W, 33W
Dial Scale	34D645618	Model SK35W
Cabinet	16E645020	Model SK32W
Cabinet	16E645011	Model SK33W
Cabinet	16F645070	Model SK35W
Cabinet Leg	16K749075	Model SK32W
Cabinet Lid	16K645024	Record Changer Compartment, Model SK32W
Cabinet Lid	16K645015	Record Changer Compartment, Model SK33W
Cabinet Lid	16K645025	Tuner & Preamp. Compartment, Model SK32W
Cabinet Lid	16K645016	Tuner & Preamp. Compartment, Model SK33W
Cabinet Lid	16K645078	Model SK35W

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1785-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	1.46KΩ	22K	0Ω	150Ω	150Ω	1.69KΩ	220K	0Ω	0Ω
V2	6BA6	2Ω	0Ω	150Ω	150Ω	1.46KΩ	1.46KΩ	150Ω		
V3	6BA6	1.8 Meg	0Ω	150Ω	150Ω	1.36KΩ	1.04K	MC		
V4	6BE6	22K	0Ω	150Ω	150Ω	1.36KΩ	1.04K	3.8Meg		
V5	6BA6	2Ω	0Ω	150Ω	150Ω	1.75KΩ	1.75KΩ	82Ω		
V6	6AU6	100K	0Ω	150Ω	150Ω	1.15K	1.15K	82Ω		
V7	6AL5	2M ● 300K ■	INF ● 300K ■	150Ω	150Ω	8000Ω	0Ω	78000Ω		
V8	EM81 6CA3	MIC ● 2.7 MEG ■	0Ω	0Ω	150Ω	150Ω	MC	1 Meg	1.1800Ω	1.1800Ω
V9	12AX7A	1.5M	0Ω	820Ω	150Ω	150Ω	1.118K	128K	1000Ω	150Ω
V10	12AX7A	1.5M	0Ω	820Ω	150Ω	150Ω	1.118K	128K	1000Ω	150Ω

● MEASURED IN "AM" POSITION.
▪ MEASURED FROM PIN 8 OF V12.
■ MEASURED IN "FM-AFC" POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

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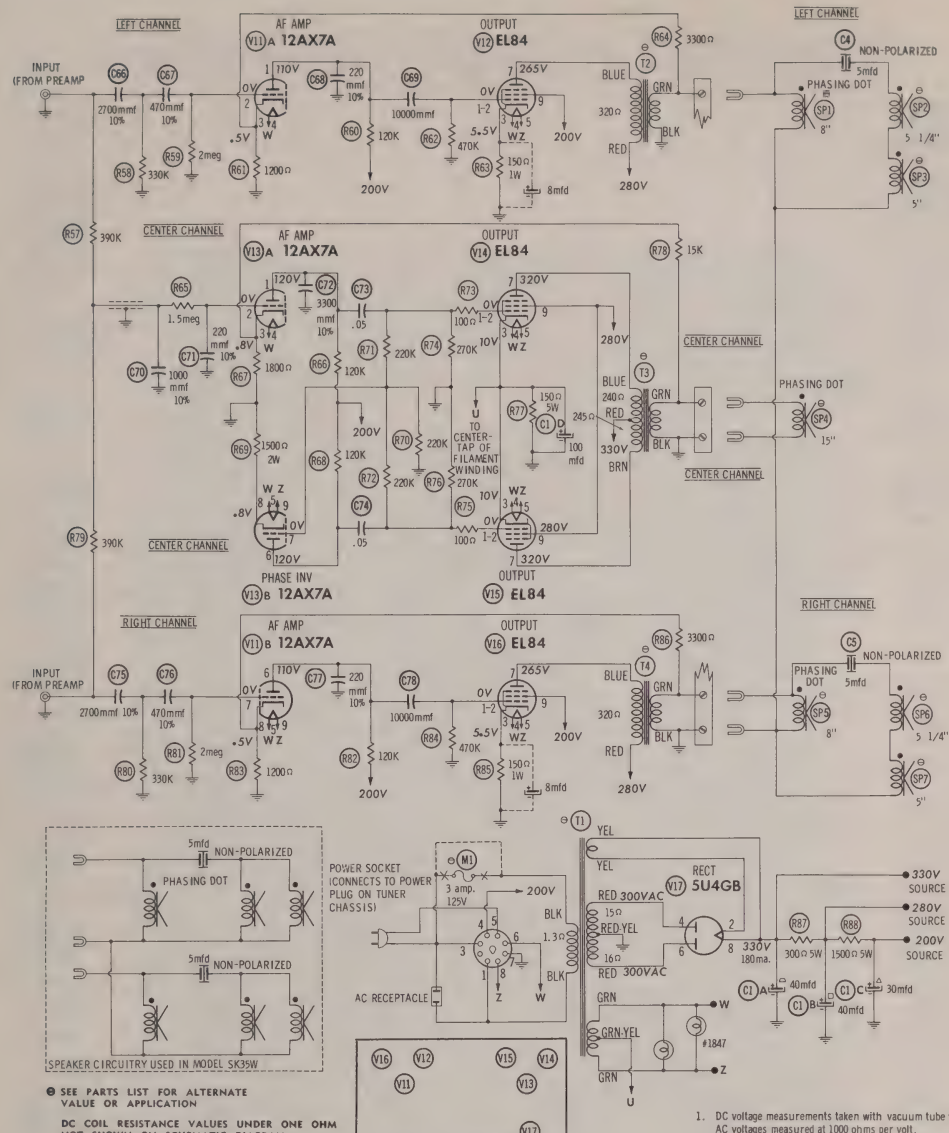
MOTOROLA MODELS SK32W, SK33W, SK35W (Ch. HS-775, HS-776, HS-778)

TUNER SCHEMATIC



❸ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.

RESISTANCE READINGS (CONT.)

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V11	12AX7A	†120K	2meg	1000Ω	150Ω	150Ω	†120K	2meg	1000Ω	150Ω
V12	EL84 6BQ5	470K	470K	150Ω	150Ω	150Ω	NC	†620Ω	NC	†1800Ω
V13	12AX7A	†120K	INF	1800Ω	150Ω	150Ω	†120K	120K	1500Ω	150Ω
V14	EL84 6BQ5	160K	160K	150Ω	150Ω	150Ω	TP	†240Ω	TP	†300Ω
V15	EL84 6BQ5	160K	160K	150Ω	150Ω	150Ω	NC	†245Ω	NC	†300Ω
V16	EL84 6BQ5	470K	470K	150Ω	150Ω	150Ω	NC	†620Ω	NC	†1800Ω
V17	5U4GB	NC	¶	NC	15Ω	NC	16Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM PIN 8 OF V17.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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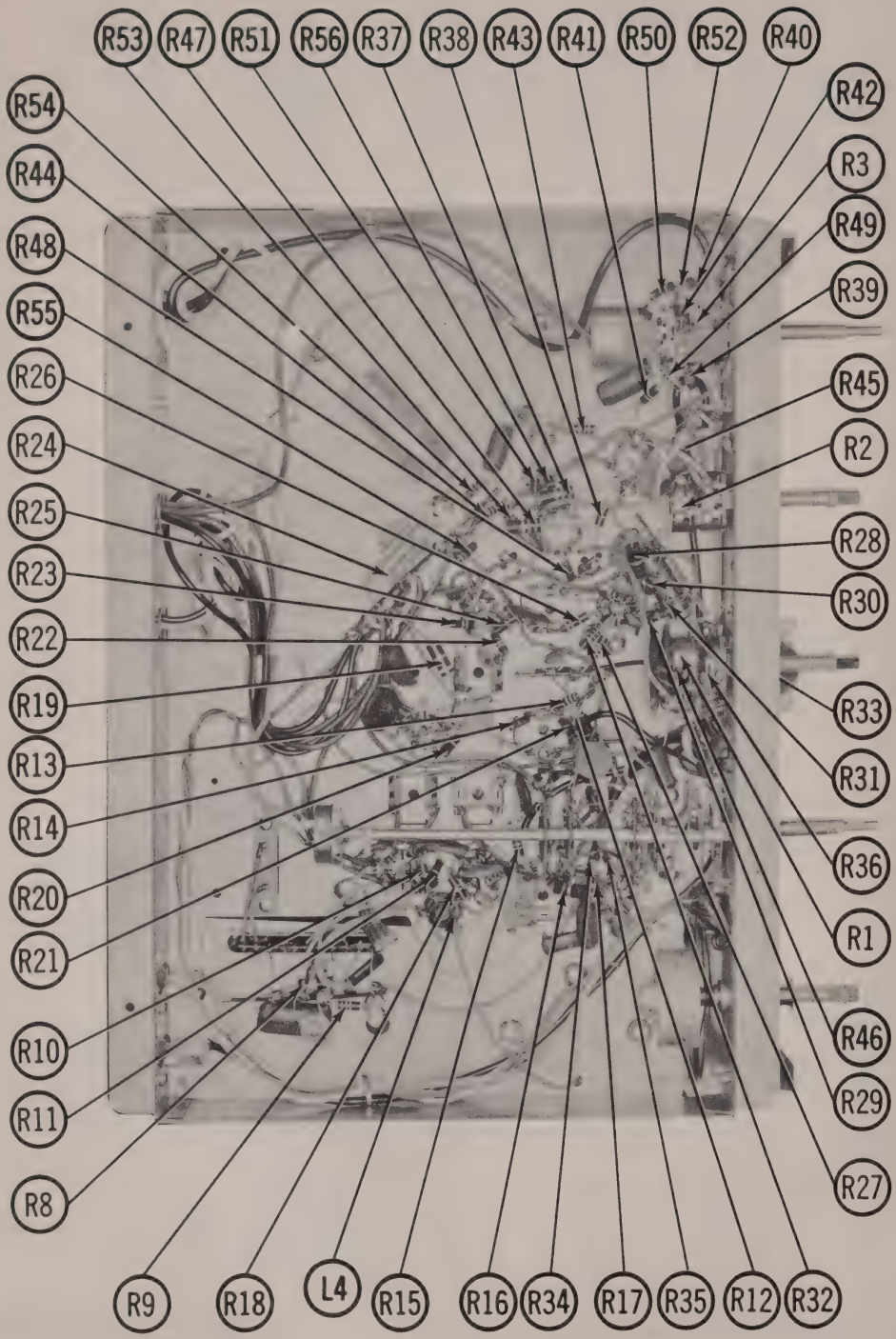
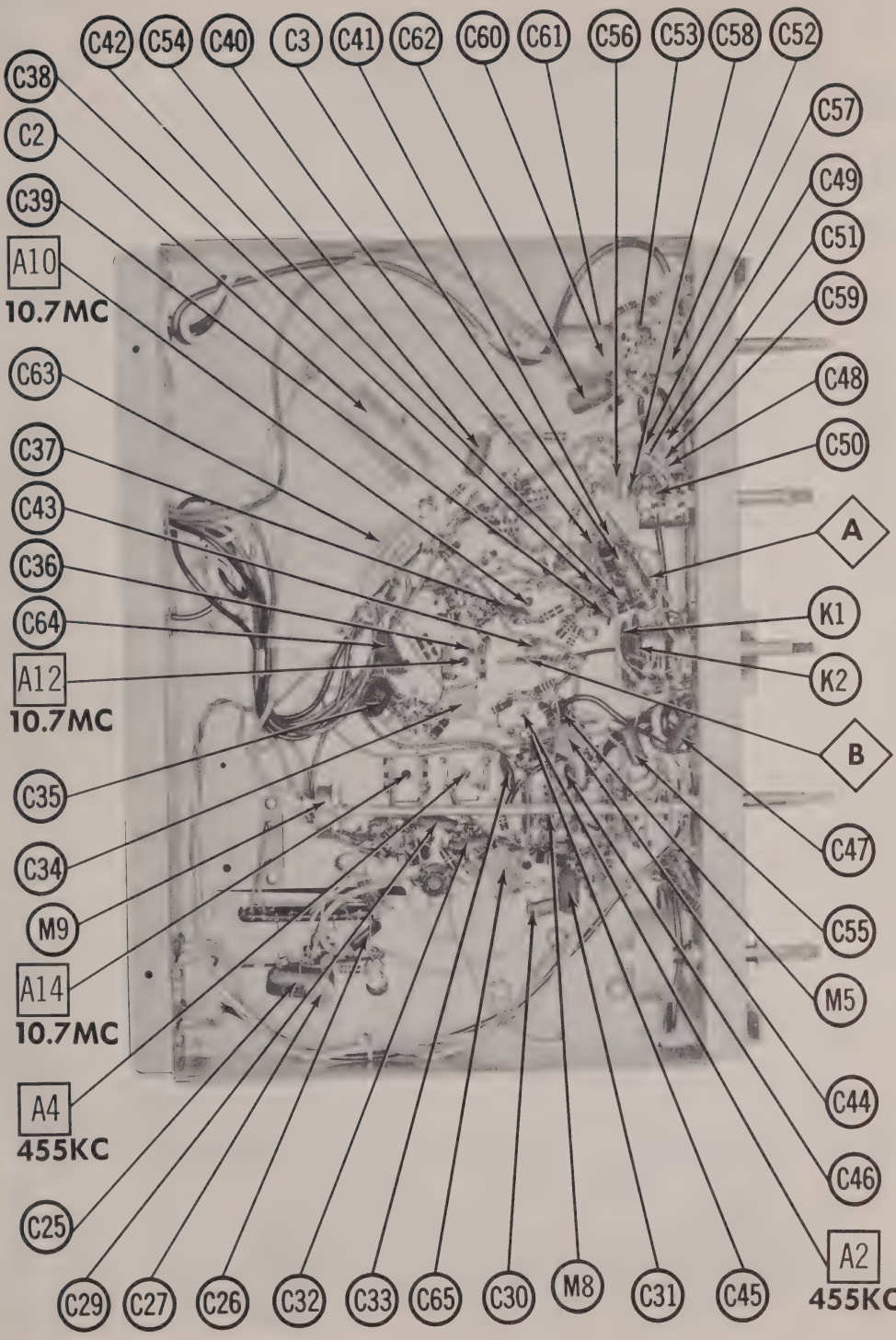
MOTOROLA MODELS SK32W, SK33W, SK35W (Ch. HS-775, HS-776, HS-778)

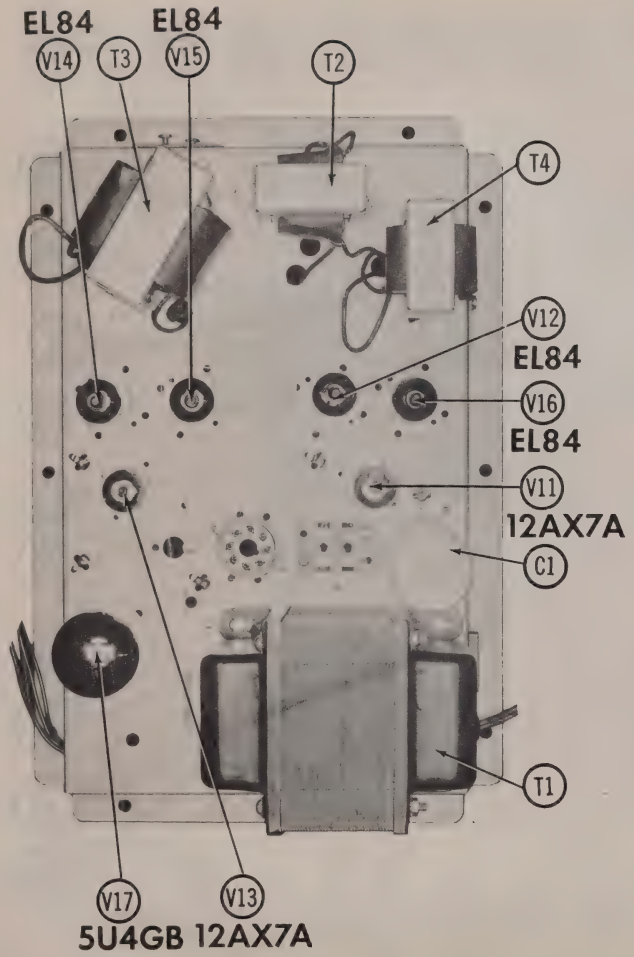
AMP SCHEMATIC



TUNER CHASSIS - BOTTOM VIEW



TUNER CHASSIS - BOTTOM VIEW



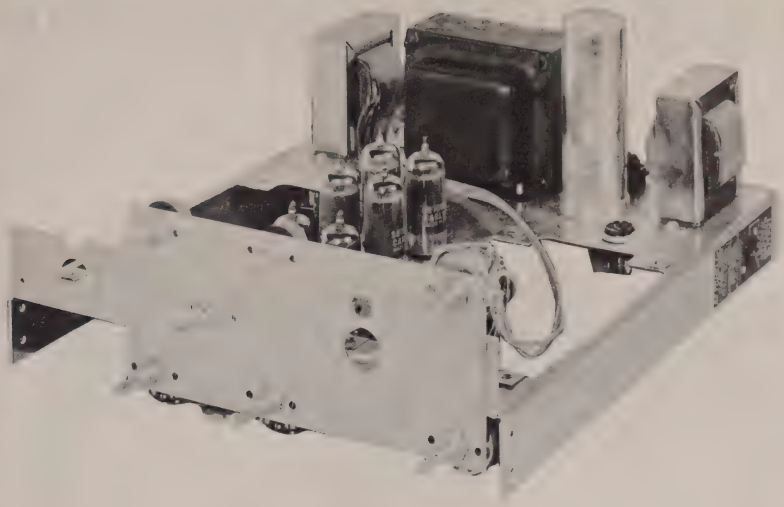
AMP CHASSIS - TOP VIEW

AMP CHASSIS - BOTTOM VIEW

PHOTOFACT® Folder

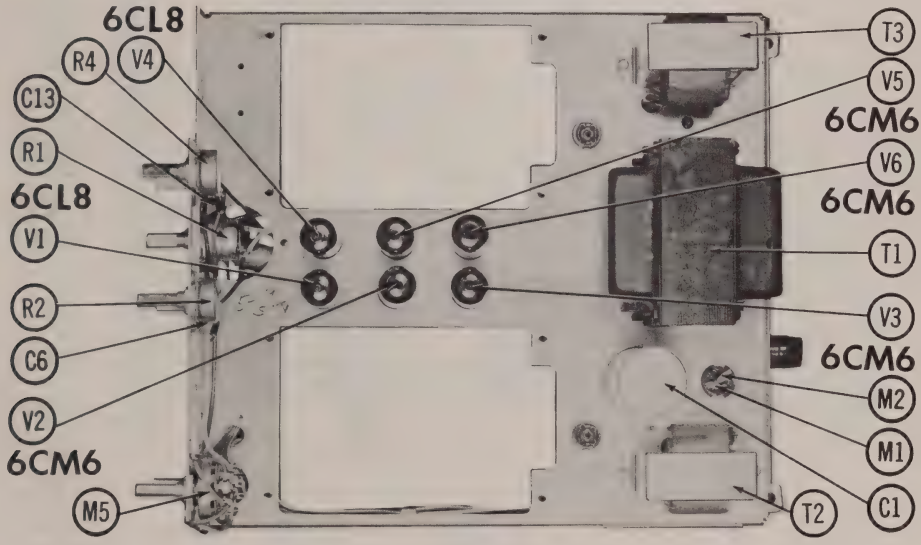
SETCHELL-CARLSON CHASSIS RP90A

SETCHELL-CARLSON CHASSIS RP90A



TRADE NAME	Setchell-Carlson Chassis Model RP90A
MANUFACTURER	Setchell-Carlson Inc., New Brighton, St. Paul 12, Minn.
TYPE SET	AC Operated 6 Tube Stereo Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 64 Watts, .68 Amp. @117 Volts AC

SETCHELL-CARLSON CHASSIS RP90A



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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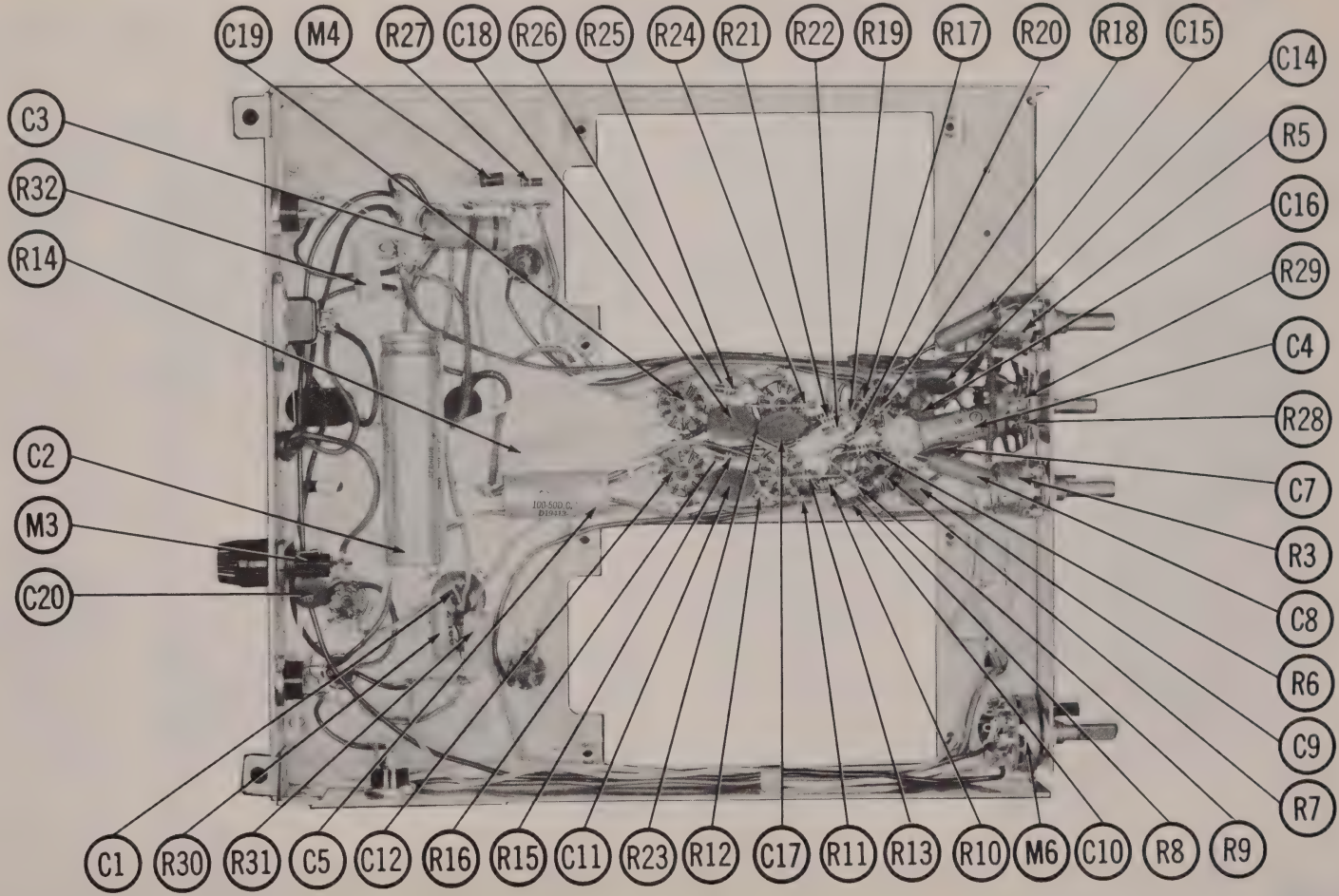
SET490 FOLDER 11



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Channel 1 AF Amp-Phase Inverter	6CL8
V2	Channel 1 Output	6CM6
V3	Channel 1 Output	6CM6
V4	Channel 2 AF Amp-Phase Inverter	6CL8
V5	Channel 2 Output	6CM6
V6	Channel 2 Output	6CM6

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Setchell-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	200	200		PRI-075	BR20025	WS342	TD-200-200	TVA-1480	
C2A	▲140	350		AFH3-29-98	D0046				
B	▲140	350			BR10035			TVLS-3648 *	
C	■20	350							
C3	5	150		SRE150V5	BBR4-150	TT150X5	TD-4-150	TVA-1403	
C4	5	150		SRE150V5	BBR4-150	TT150X5	TD-4-150	TVA-1403	
C5	100	50		PRS1360	BR1005	TC3501	TD-100-50	TVA-1310	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C7	30000		BPD-03	DD-303	BYB6S3	CCD-303	GP130	5HK-S30
C8	.0033 400V 10%		V84C4D33-10%		PM6D33	6DP-1-332	GEM-16233	6TM-D33
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C10	30000		BPD-03	DD-303	BYB6S3	CCD-303	GP130	5HK-S30
C11	30000		BPD-03	DD-303	BYB6S3	CCD-303	GP130	5HK-S30
C12	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C14	30000		BPD-03	DD-303	BYB6S3	CCD-303	GP130	5HK-S30
C15	.0033 400V 10%		V84CD33-10%		PM6D33	6DP-1-332	GEM-16233	6TM-D33
C16	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C17	30000		BPD-03	DD-303	BYB6S3	CCD-303	GP130	5HK-S30
C18	30000		BPD-03	DD-303	BYB6S3	CCD-303	GP130	5HK-S30
C19	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C20	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Setchell-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	816	B-60-S	A47-500K-Z	Q13-133	U48	Master Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On
R2A	5meg	½	817	B-88	A47-5meg-Z	Q13-141	U65	Gain, Channel 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	500K	½	816	B-60-S	A47-500K-Z	Q13-133	U48	Tone, Channel 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Channel 1 Filaments Off-On
R4A	5meg	½	817	B-88	A47-5meg-Z	Q13-141	U65	Gain, Channel 2
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	500K	½	816	B-60-S	A47-500K-Z	Q13-133	U48	Tone, Channel 2
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Channel 2 Filaments Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R6	220K	
R7	1meg	
R8	2.2meg	
R9	47K	
R10	47K	
R11	22K	
R12	470K	
R13	22K	
R14	200Ω 7W	
R15	22K	
R16	470K	
R17	220K	
R18	1meg	
R19	2.2meg	
R20	47K	
R21	47K	
R22	22K	
R23	470K	
R24	22K	
R25	22K	
R26	470K	
R27	4700Ω	
R28	150K	
R29	220K	
R30	100Ω 5W	
R31	2000Ω 5W	
R32	3Ω 5W	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	Setchell-Carlson PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	115V ⓐ .68A	110V ⓐ .5A	8V ⓐ .00A Tap ⓐ 6.3V ⓐ 2.7A	TM1018A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	Setchell-Carlson PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	9500Ω CT	6-8Ω	TM1162	24S55	A-3027	AU-609	A-3870	24S55	S-57Z	
T3	9500Ω CT	6-8Ω	TM1162	24S55	A-3027	AU-609	A-3870	24S55	S-57Z	

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	Setchell-Carlson PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.150A		5E4	SD500	40K	SR500	
M2	.150A		5E4	SD500	40K	SR500	

FUSES

ITEM No.	TYPE	RATING	Setchell-Carlson PART No. FUSE	Setchell-Carlson PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3	3AG	2A 250V			312002 (3AG 2A 250V)	342001	AGC 2	HKP

CRYSTAL DIODES

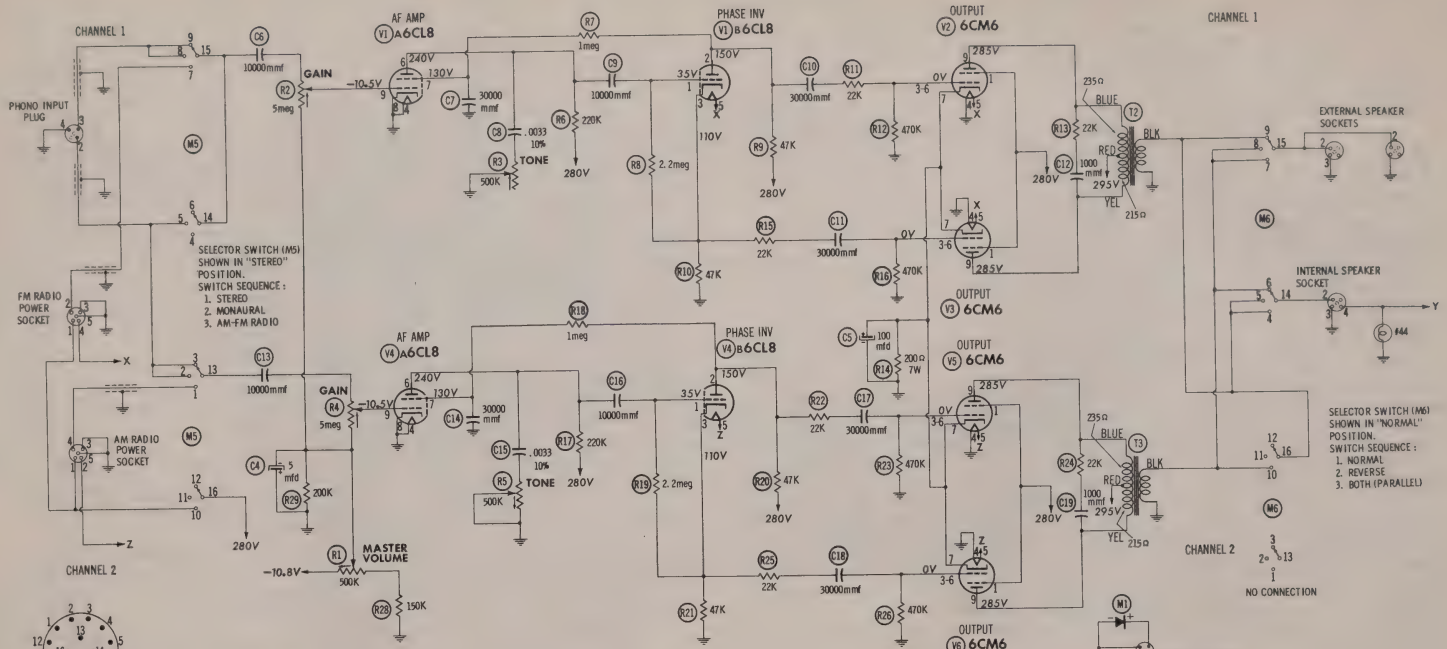
ITEM No.	ORIG. TYPE	Setchell-Carlson PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M4	1N60		1N60	1N60	1N60	Bias Rectifier (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Setchell-Carlson PART No.	NOTES
M5	Switch		Function Selector
M6	Switch		Speaker Selector

SETCHELL-CARLSON CHASSIS RP90A

FOLDER 11



TERM VIEW (M6) & (M5).

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CL8	2.2meg	†49K	47K	0Ω	.8Ω	†220K	†1meg	0Ω	90K
V2	6CM6	†2100Ω	NC	470K	0Ω	.8Ω	470K	200Ω	TP	†335Ω
V3	6CM6	†2100Ω	TP	470K	0Ω	.8Ω	470K	200K	NC	†315Ω
V4	6CL8	2.2meg	†49K	47K	0Ω	.8Ω	†220K	†1meg	0Ω	90K
V5	6CM6	†2100Ω	NC	470K	0Ω	.8Ω	470K	200Ω	TP	†335Ω
V6	6CM6	†2100Ω	TP	470K	0Ω	.8Ω	470K	200Ω	NC	†315Ω

† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION
TP TIE POINT

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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SETCHELL-CARLSON CHASSIS RP90A

PHOTOFACT® Folder

SILVERTONE MODELS 55A, 56A, 63A, 64A (Ch. 528.53810, 528.53820)

SILVERTONE MODELS 55A, 56A, 63A, 64A (Ch. 528.53810, 528.53820)

MODEL 63A

SILVERTONE MODELS 55A, 56A, 63A, 64A (Ch. 528.53810, 528.53820)

TRADE NAME	Silvertone Models 55A, 56A (Ch. 528.53810); 63A, 64A (Ch. 528.53820)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated 5 Tube AM Receiver With Stereo Output and 4 Speed Automatic Record Changer
POWER SUPPLY	110 — 120 Volts AC, 60 Cycles RATING 31 Watts, .33 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	532 — 1610KC

FOR SERVICE INFORMATION ON RECORD CHANGER 528.56664 or 528.56665 — SEE SIMILAR SILVERTONE 528.56000 SERIES — PHOTOFACT SET 417 FOLDER 10

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1 thru A4..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A5, A7..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A6..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1610KC	"	"	A5	"
3.	"	532KC	Tuning gang fully closed.	"	A6	Adjust for maximum output. Repeat Steps 2 and 3.
4.	Loop	1400KC	Tune to 1400KC Signal.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	12BE6	V4	Left Channel Output	35C5
V2	IF Amplifier	12BA6	V5	Right Channel Output	50C5
V3	Left Channel AF Amp. Right Channel AF Amp.	12AX7			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▬150	150	18-60-3	AFH4-38-90	D0310	FP420.54	TMT-68	TVL-3449	
B	■50	150			BBR25-25	TC492	TD-25-25	TVA-1205	
C	▲25	25							
D	25	25							
C2	4	150NP	18-9-5	NP-PRS7750	BBR8-150 †	TCN510		TVANS-1402.1 *	①

① Not used in Chassis 528, 53810.
† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

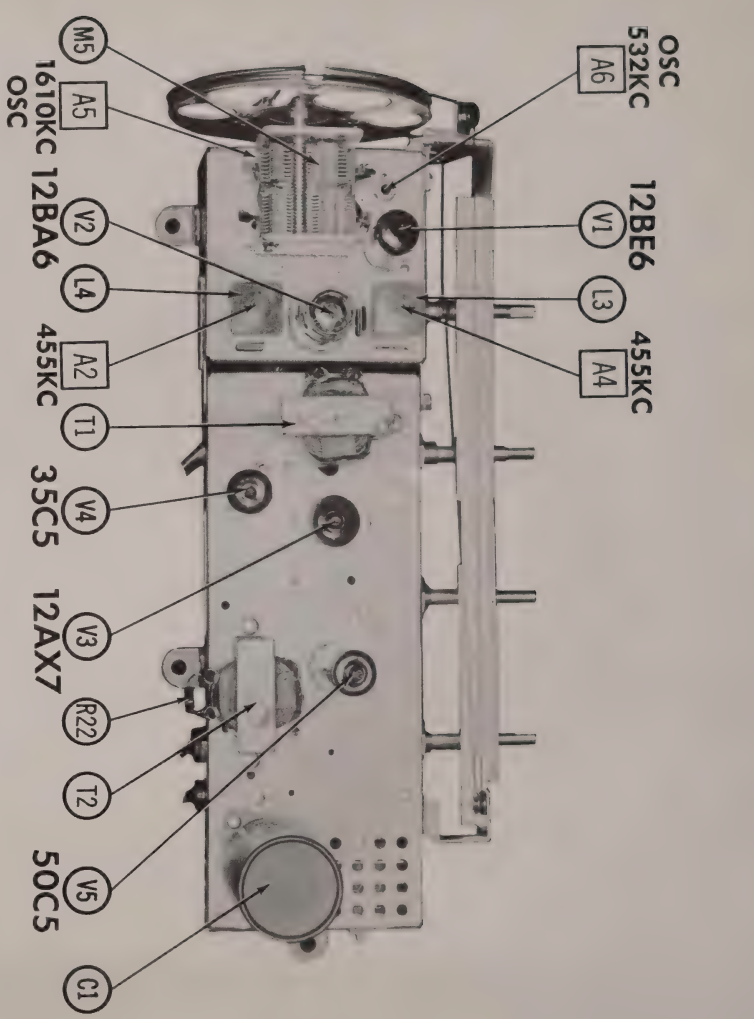
ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C4		#19-180-0						
C5	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C6	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C7	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C8	150 N750 10%		N750-DI 150	DTN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15
C9	150 N750 10%		N750-DI 150	DTN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15
C10	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C11	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C12	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C13	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C14A	5000		BPD-2X0047	DD3-502	BYD6DD5	CCD-502	B2X250	5HK-2D47
B	5000					CCD-502		
C15	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C16	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C17	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C18	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C19	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C20	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C21	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C22	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C23	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C24	560	Note 1	DI-560	DD-561	L10T56	CCD-561	GP356	10TS-T56
C25	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47

Note 1. Not used in some versions.
Silvertone Part Number.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	24-339-0					Loudness, Left Channel
	1meg Tap							
B	2meg	½						Balance, Right Channel
	1meg Tap							
R2A	1meg	½	24-213-2	AB-70	AD47-1meg-Z		FB16A	Treble, Left Channel
B	1meg	½		SR-70	Not Req.		RU16A	Treble, Right Channel
C	Shaft			AK-8	RS-3/16		CS687, DS-37	
R3A	5meg	½	24-214-2				FD56R	Bass, Left Channel
B	5meg	½					RU56R	Bass, Right Channel
C	Shaft						CS687, DS-37	
D	Switch						U841	Power On-Off

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	47K	
R5	220K	
R6	2.2meg	
R7	2.2meg	
R8	22K	
R9	150Ω	
R10	100K	

ITEM No.	RATING	REMARKS
R11	4.7meg	
R12	270K	
R13	470K	
R14	100Ω	
R15	120Ω	
R16	100K	
R17	4.7meg	

ITEM No.	RATING	REMARKS
R18	270K	
R19	470K	
R20	100Ω	
R21	120Ω	
R22	220Ω	
R23	1000Ω 1W	
R24	27Ω 2W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		SILVERTONE PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	82-126-0	14-9003	14-9003	BC-418	2000		①
L2	Osc. Coil	10-50-4			BC-393			
L3	Input IF Trans.	10-108-2	16-6758	16-6758	BC-352	12-C1	RF-1	②
L4	Output IF Trans.	10-110-2	16-6758	16-6758	BC-353	12-C2	RF-2	

① Includes C4.
② Alt. Part #10-108-1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2600Ω	6-8Ω	B80-78-1D ①	22S86	A-2903	AU-603	A-3849②	22S86		
T2	2600Ω	6-8Ω	B80-78-1D①	22S86	A-2903	AU-603	A-3849②	22S86		

① Alternate Part #80-78-1.
② Drill New Mounting Hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	33-411-4 *	8A1Z7.9	* Models 63A, 64A
SP2	4"	PM	3-4Ω	33-299-4A *	4A15	♦ 2 Used, Models 55A, 56A
SP3	4"	PM	3-4Ω	33-299-4A *	4A15	
	5"x 7"	PM	6-8Ω	33-409-4 ♦		

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SILVERTONE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.070A	86-15-3①	RS150①	1235AH①	150 ①	SR200②	① Selenium Type ② Silicon Type

PHONO CARTRIDGE

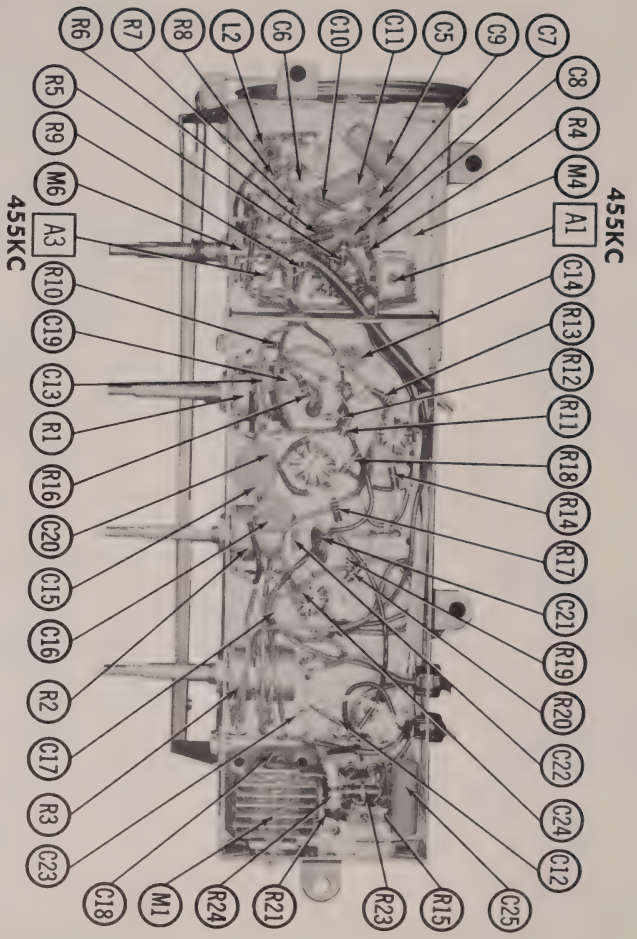
ITEM No.	REPLACEMENT DATA								
	SILVERTONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M2	33-311-0	13TB	Not Req.	26S	S1-1 & S3-3	53		8TA4-S	N-8TA-S

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SILVERTONE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M3	83-1252 (LP)	W-102MGS † or W-102MGD ♦	E98X † or E98XD ♦	† Jewel ♦ Diamond
	83-125-0 (78 RPM)	W-101STS † or W-101STD ♦	E98 † or E98D ♦	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SILVERTONE PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M4	CTP-461		1N60	1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M5	Tuning Cap.	19-78-2	2 Gang (Ant. 13-343mmf, Osc. 16-120mmf)
M6	Switch	69-287-0	Radio-Phono
M7	Switch	69-282-0	Stereo-Monaural (Part of Changer)
M8	Switch	84-7838	Off-On (Part of Changer)
M9	Motor	59-162	Drive, Part of Changer Chassis 528.56664
	Motor	59-158	Drive, Part of Changer Chassis 528.56665

CABINETS & CABINET PARTS

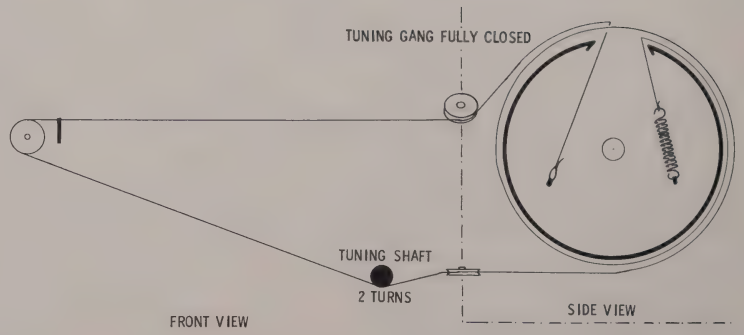
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

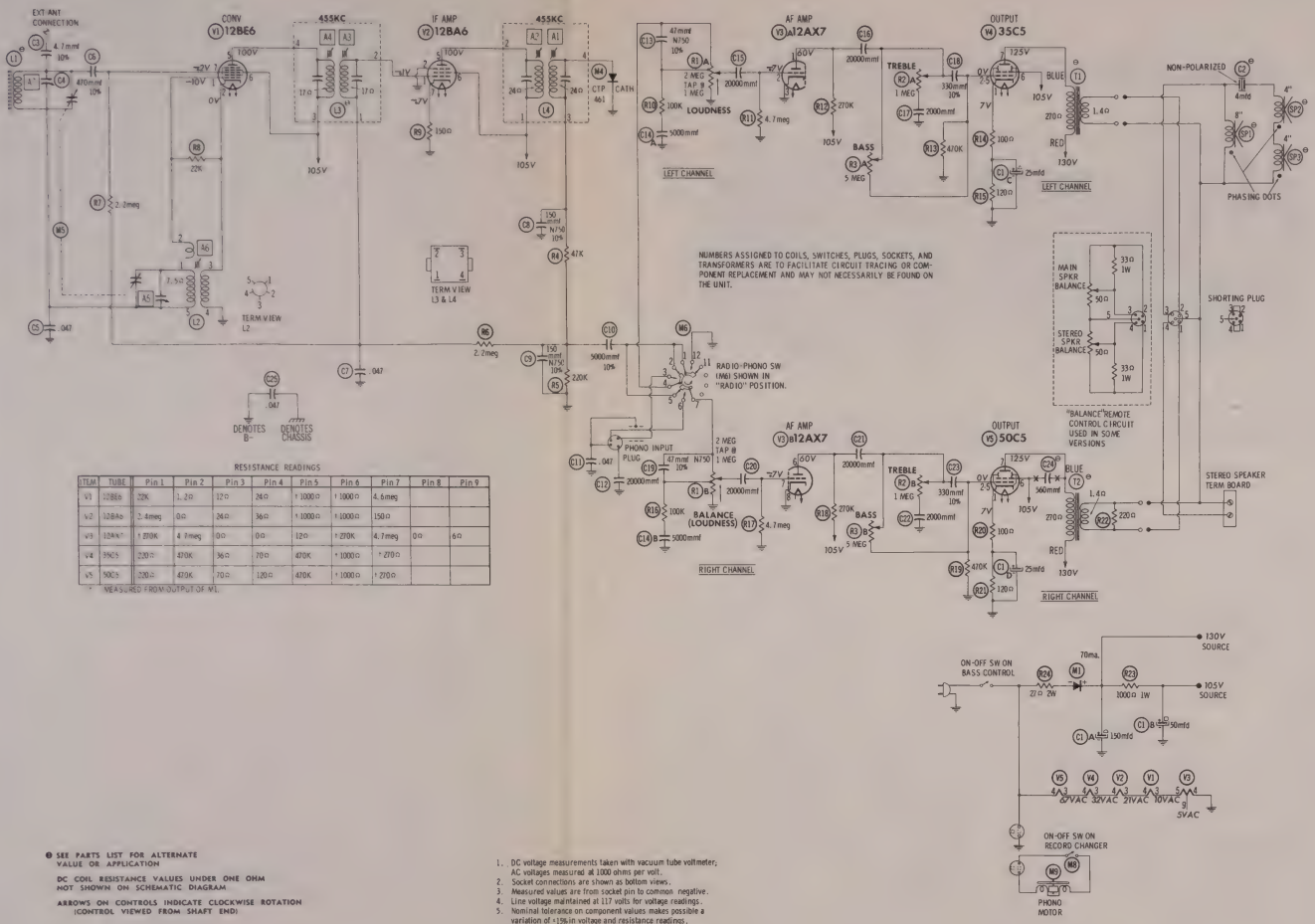
NAME	PART NO.	DESCRIPTION
Knob	52-1109-0	Tuning
Knob	52-1266-0	Loudness
Knob	52-1144-0	Off-On-Bass, Treble
Knob	52-1245-0	Stereo Balance
Knob	52-1237-0	Off-On-Reject (Part of Changer)
Knob	52-1132-0	Radio-Phono
Knob	52-1238-0	Speed Control (Part of Changer)
Pointer	52-213-1	Model 63A, 64A
Pointer	52-214-1	Model 55A, 56A
Window	48-164-1	Dial Scale
Cabinet	42-119-3	Model 63A
Cabinet	42-120-3	Model 64A
Cabinet	42-113-3	Model 55A
Cabinet	42-114-3	Model 56A
Cabinet	42-36-4	Speaker, Model 55A
Cabinet	42-37-4	Speaker, Model 56A
Cabinet Lid	52-518-0	Model 55A
Cabinet Lid	52-519-0	Model 56A
Cabinet Leg	49-499	Model 63A
Cabinet Leg	49-500	Model 64A

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

DIAL CORD STRINGING





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BE6	22K	1.2Ω	12Ω	24Ω	†1000Ω	†1000Ω	4.6meg		
V2	12BA6	2.4meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	150Ω		
V3	12AX7	†270K	4.7meg	0Ω	0Ω	12Ω	†270K	4.7meg	0Ω	6Ω
V4	35C5	220Ω	470K	36Ω	70Ω	470K	†1000Ω	†270Ω		
V5	50C5	220Ω	470K	70Ω	120Ω	470K	†1000Ω	†270Ω		

† MEASURED FROM OUTPUT OF V1.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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SILVERTONE MODELS 55A, 56A, 63A, 64A (Ch. 528.53810, 528.53820)

PHOTOFACT® Folder with CIRCUITRACE®

SILVERTONE MODELS 69A, 70A, 71A
(Ch. 528.53830, 528.59441, 528.59680)

SILVERTONE MODELS 69A, 70A, 71A
(Ch. 528.53830, 528.59441, 528.59680)

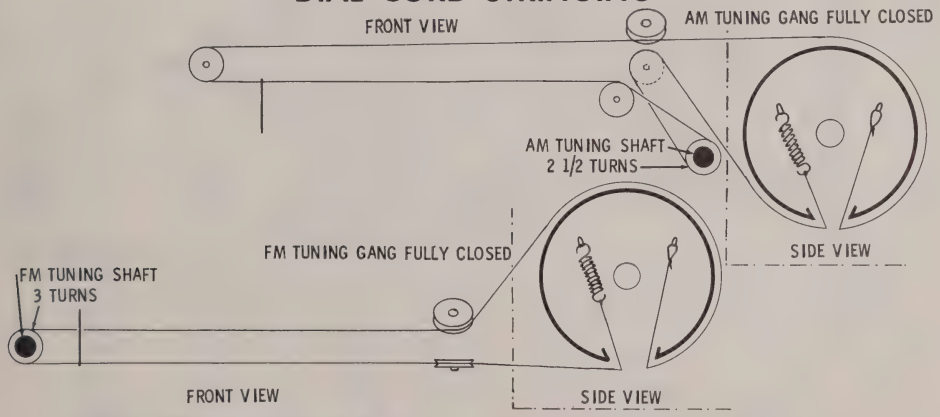
MODEL 69A

SILVERTONE MODELS 69A, 70A, 71A
(Ch. 528.53830, 528.59441, 528.59680)

TRADE NAME	Silvertone Models 69A, 70A, 71A (Tuner Ch. 528.53830, Preamp. Ch. 528.59680, Amp. Ch. 528.59441)		
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois		
TYPE SET	AC Operated 8 Tube FM-AM Tuner, 2 Tube Stereo Preamplifier, 7 Tube Stereo Amplifier and 4 Speed Automatic Record Changer		
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles	RATING	134 Watts, 1.27 Amp. @117 Volts AC (Radio)
TUNING RANGE—BROADCAST	532 — 1630KC	FREQ. MOD.	88 — 108MC

FOR SERVICE INFORMATION ON RECORD CHANGER 528.56762 OR 528.56763 — SEE SIMILAR SILVERTONE 528.56000 SERIES — PHOTOFACT SET 417 FOLDER 10

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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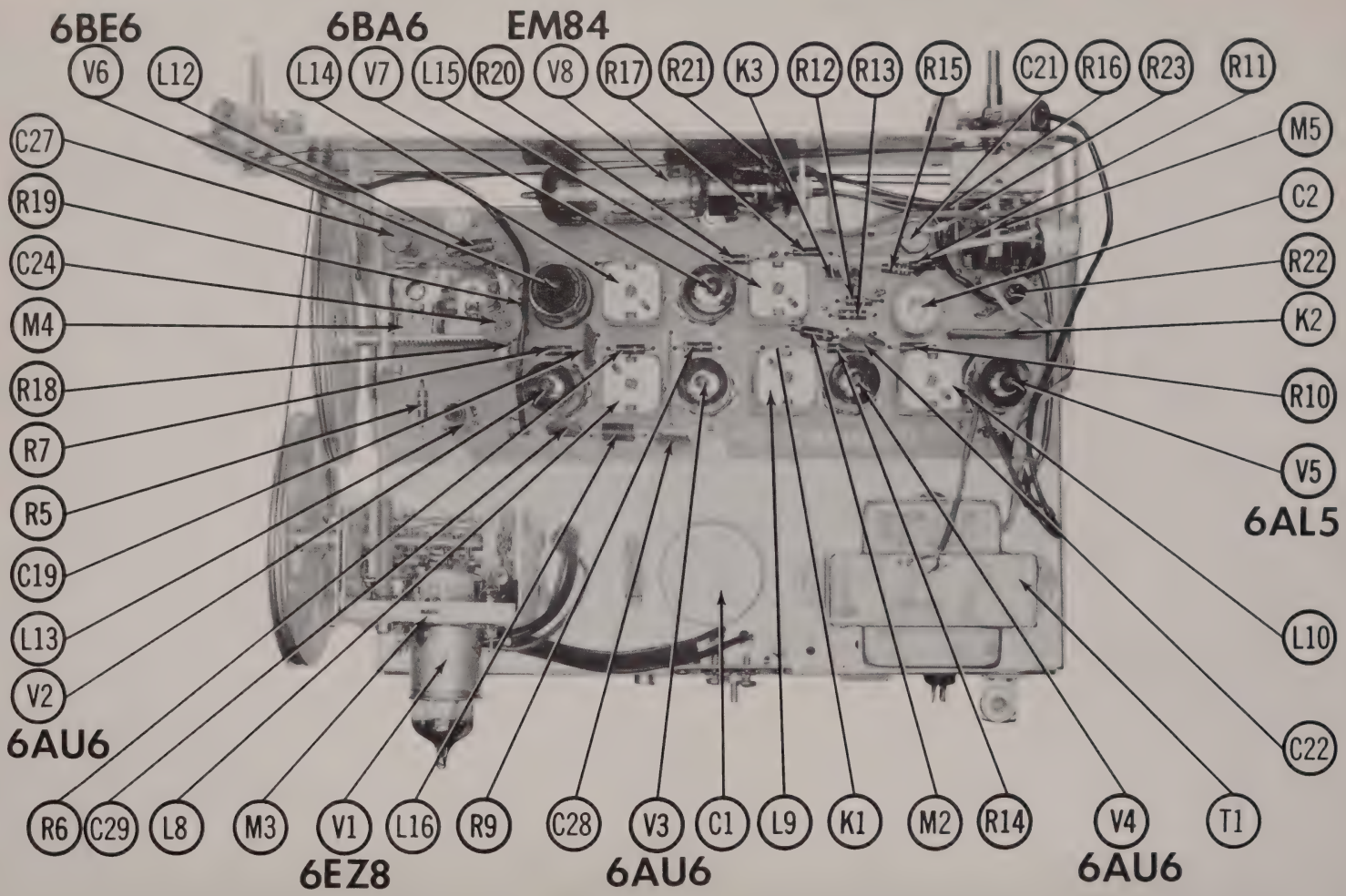
SET490 FOLDER 13



TUNER CHASSIS TOP VIEW

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amp. -Mixer-Osc.	6EZ8	V5	Ratio Detector	6AL5
V2	1st FM IF Amplifier	6AU6	V6	AM Converter	6BE6
V3	2nd FM IF Amplifier	6AU6	V7	AM IF Amplifier	6BA6
V4	FM Limiter	6AU6	V8	Tuning Indicator	EM84/6FG6

CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	150	18-57-3	AFH3-11-40	XC0123	FP330.9	TMQ-136	TVL-3443.2	
B	■60	150							
C	▲60	150							
C2	8	50	18-98-5	BCD-50008	BBR8-150	TC41	TD-8-150	TVA-1405	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	180	#277-181						
C4	1.5	#274-159						
C5	10		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C6	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C7	8		NPO-DI 8.2	DD-080	C10V8C			10TCC-V82
C8	1000		EF-001	MFT-1000		CCF-102	CT280A	
C9	33	#275-330						
C10	4.5							
C11	500		1468-0005	DD-501	5W5T5	CM-19B-501M	GP350	1FM-350
C12	1.5	#274-159						
C13	33		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C14	3.3		NPO-DI 3.3	DTZ-3R3	C10V33C	CCTO-3R3	CNO-533	10TCC-V33
C15								
C16	1000		EF-001	MFT-1000		CCF-102	CT280A	
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C18	1000		EF-001	MFT-1000		CCF-102	CT280A	
C19	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C20	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C21	.047 200V		P2151N-047	DD-503	BC2S47J	4DP-3-473	ACE6147	2SE-S47
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C23	.68 10%		NPO-SI .68	TCZ-R68				
C24	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C25	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C26	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C27	.047 200V		P2151N-047	DD-503	BC2S47J	4DP-3-473	ACE6147	2SE-S47
C28	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50

Silvertone Part Number.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	82Ω	
R2	330K	
R3	39K	
R4	8200Ω	
R5	560Ω	
R6	1000Ω	
R7	82Ω	
R8	1000Ω	
R9	82Ω	

ITEM No.	RATING	REMARKS
R10	3.3meg	
R11	3.3meg	
R12	3.3meg	
R13	10K	
R14	82Ω	
R15	470K	
R16	47K	
R17	2.2meg	
R18	2.2meg	

ITEM No.	RATING	REMARKS
R19	18K	
R20	82Ω	
R21	560K	
R22	470K	
R23	47K	
R24	390Ω 1W	
R25	390Ω 1W	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K1	FM Limiter Grid Filter	100mmf, 47K	13-2-2		
K2	Ratio Detector Network	300mmf, 300mmf, 300mmf, 1000mmf, 68Ω, 1000Ω, 1500Ω, 6800mmf, 6800mmf, 68K	13-35-3	Aerovox Centralab	PA-694 PC-342
K3	AM Diode RF Filter	100mmf, 100mmf, 47K	13-2-2	Aerovox Centralab Cornell-Dubilier Sprague	PA-97 PC-50 11TM1 D-1

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA SILVERTONE PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	3191						
L2	RF Choke	3192-8						
L3	Cathode Choke	300-2						
L4	RF Choke	301-11						
L5	FM Osc. Coil	3197						
L6	RF Choke	3190-24						
L7	1st FM IF Trans.	3193						
L8	2nd FM IF Trans.	10-117-2	16-3490	16-3490		1463-PC		
L9	3rd FM IF Trans.	10-118-2	16-3490	16-3490		1463-PC		
L10	Ratio Det.	10-29-0	17-3492	17-3492		1465-PC		
L11	Loop Ant.	82-14-1 *						
L12	RF Choke	10-140-1	19-1002	19-1002	BC-563	4606		2.2uh
L13	AM Osc. Choke	10-55-4						
L14	1st AM IF Trans.	10-116-2	16-6780	16-6780	BC-356	13-PC1	RF-4	
L15	2nd AM IF Trans.	10-116-2	16-6780	16-6780	BC-357	13-PC2	RF-4	
L16	Fil. Choke	10-28-0						

* Trimmer Part #19-180-0 mounted on loop.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .35A	120V@ .050A	6.3V@ 2.8A	C80-37-0C①						

① Alternate Part #80-37-0.

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA SILVERTONE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.050A	86-21-3 *	RS065 *	1234AH *	65 *	SR200 ♦	* Selenium Type ♦ Silicon Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA SILVERTONE PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M2	1N541		1N295	1N295	1N295	AM Det. (Pigtail)

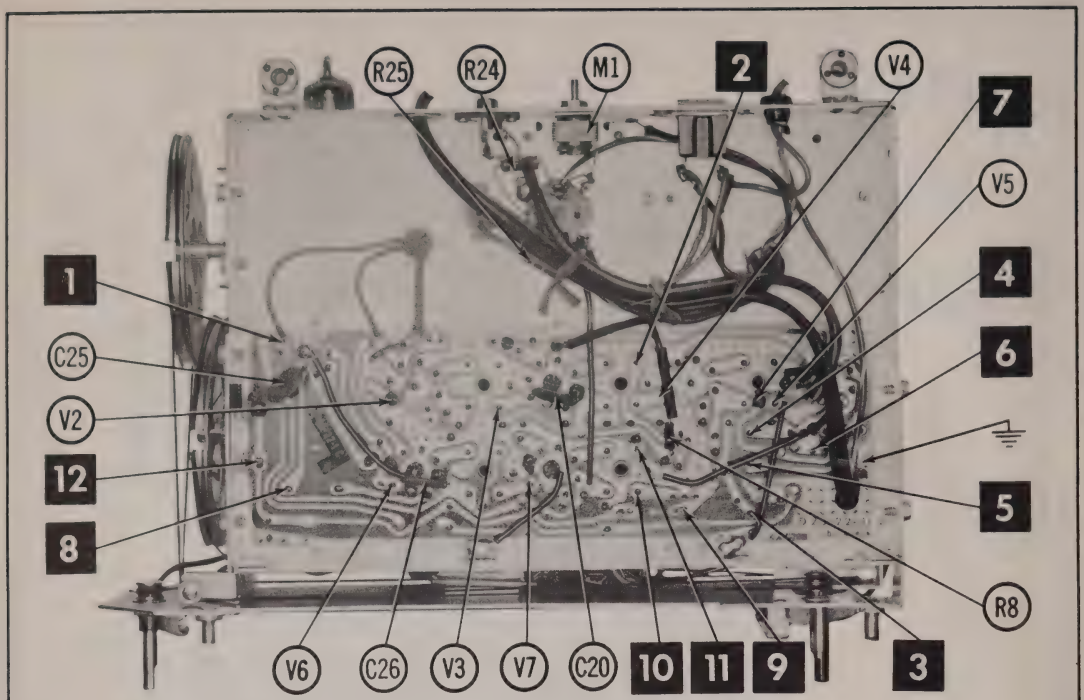
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Tuner	95-201-0	FM Complete (Includes Tuning Cap (3 Gang) #899)
M4	Tuning Cap.	19-84-2	AM 2 Gang
M5	Switch	69-313-0	Function Selector
M6	Switch	69-269-0	Automatic Power Switch

SET 490 FOLDER 13 PAGE 3

FOLDER 13

SILVERTONE MODELS 69A, 70A, 71A (Ch. 528.5380, 528.5944I, 528.5968O)



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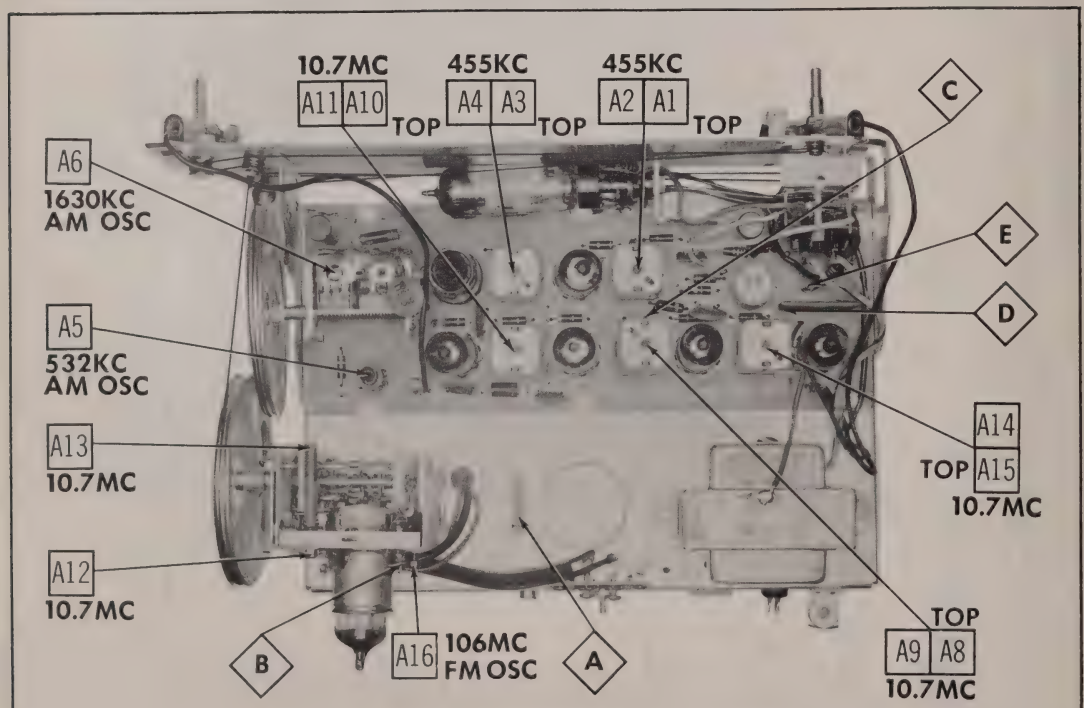
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



TUNER CHASSIS TOP VIEW - ALIGNMENT IDENT.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment tools:
A1 thru A4, A8 thru A11, A14, A15...GENERAL CEMENT #5097, 8727
WALSCO #2515
A6, A7, A16..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A5..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A12, A13.....GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532

AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	(AM) Tuning gang fully open.	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	Loop	532KC	Tuning gang fully closed.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1630KC	Tuning gang fully open.	"	A6	Adjust for maximum deflection. Repeat Steps 2 and 3.
4.	"	1400KC	Tune to 1400KC Signal.	"	A7	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .01mfd to point (B). Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point (C). Common to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum deflection.
6.	"	"	"	DC probe to point (D). Common to chassis.	A14	"
7.	"	"	"	DC probe to point (E). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .01mfd to point (B). Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point (C). Low side to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. amp. to point (D). Low side to chassis.	A14	Disconnect stabilizing Capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
7.	"	"	"	Vert. amp. to point (E). Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	Across FM antenna terminals with 120Ω in each lead.	106MC (Unmod.)	(FM) 106MC	DC probe to point (C). Common to chassis.	A16	Adjust for maximum deflection.

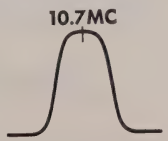


FIG. 1

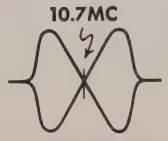


FIG. 2

PREAMP PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

TUBES

• CBS • GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V9	Main Channel Preamp. - Stereo Channel Preamp.	7025	V10	Main Channel Preamp. - Stereo Channel Preamp.	12AU7A

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C30A	▲20	350	18-58-3	AFH2-69	B0500	FP282.5	TMD-61	TVL-2935	
B	▲20	350							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C31	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C32	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C33	820 10%		DI-820	DD-820	1R5T82	CCD-821	GP382	10TS-T82
C34	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C35	1500 10%		DI-1500	DD-152	1R5D15	CCD-152	GP215	10TS-D15
C36	100 10%		DI-100	DD-101	22R5T1	CCD-101	GP310	10TS-T10
C37	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C38	3000 10%		DI-3000		PM6D3	CCD-302	JL-233	10TS-D30
C39	200 N1500	#15-20111				*		
C40	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C41	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C42	15000		BPD-015	DD-153	BYA10S15	CCD-153	GP115	5HK-S15
C43	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C44	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C45	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C46	820 10%		DI-820	DD-820	1R5T82	CCD-821	GP382	10TS-T82
C47	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C48	1500 10%		DI-1500	DD-152	1R5D15	CCD-152	GP215	10TS-D15
C49	100 10%		DI-100	DD-101	22R5T1	CCD-101	GP310	10TS-T10
C50	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C51	3000 10%		DI-3000		PM6D3	CCD-302	JL-233	10TS-D30
C52	200 N1500	#15-20111				*		
C53	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C54	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C55	15000		BPD-015	DD-153	BYA10S15	CCD-153	GP115	5HK-S15
C56	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20

Silvertone Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R26A	2meg *		24-358-0					Loudness, Main Channel
B	2meg *							Loudness, Stereo Channel
R27A	1meg		24-203-2	F1-52		† QJ-1132R	■ UE4068	Bass, Main Channel
B	1meg			R2-52				Bass, Stereo Channel
R28A	1meg		24-202-2	F1-54		† QJ-1132R	■ UE4068	Treble, Main Channel
B	1meg			R2-54				Treble, Stereo Channel

* Taps ⓐ 500K & 1meg.
† "Concentrikit" equivalent: K-6 Kit with base elements & shafts: B13-137, P17-028 (Panel)
Not available as a factory assembled unit. B13-137, R9-110 (Rear)
■ "STA-LOC" equivalent: FA16A, RU16A, OS875A, IS1375.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R29	47K	
R30	1.5meg	
R31	4.7meg	
R32	470K	
R33	100K	
R34	10K	
R35	47K	

ITEM No.	RATING	REMARKS
R36	47K	
R37	470Ω	
R38	47K	
R39	1.5meg	
R40	4.7meg	
R41	470K	
R42	100K	

ITEM No.	RATING	REMARKS
R43	10K	
R44	47K	
R45	47K	
R46	470Ω	
R47	22K 1W	
R48	22K	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K4	Loudness Comp.	18mmf, 27mmf, 3300mmf, 4700mmf, 47K, 68K, 330K	13-19-3	
K5	Rumble Filter	4000mmf, 4000mmf, 8000mmf, 500K, 1meg, 1meg	13-37-3	
K6	Loudness Comp.	18mmf, 27mmf, 3300mmf, 4700mmf, 47K, 68K, 330K	13-19-3	
K7	Rumble Filter	4000mmf, 4000mmf, 8000mmf, 500K, 1meg, 1meg	13-37-3	

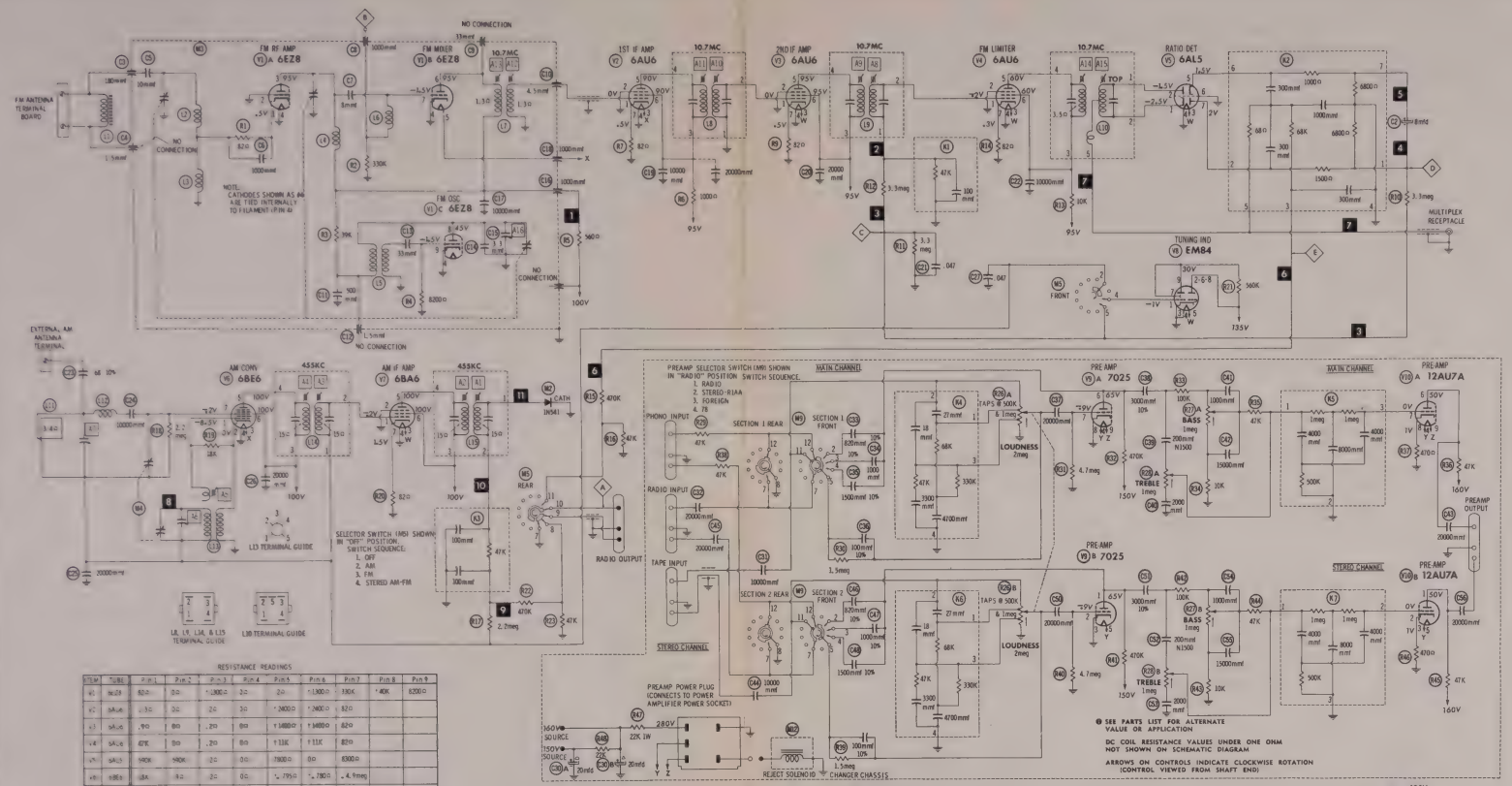
PHONO CARTRIDGE

ITEM No.	SILVERTONE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M7	33-314-0	13TBX		26DS				8TA4-SD	N-8TA-SD

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA SILVERTONE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M8	83-1308 †♦	W-103STSS † or W-103STDS ♦	S-69X † or S-69XSD †♦ or S-69XDD ♦	† Jewel ♦ Diamond



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6EB8	820Ω	0Ω	1300Ω	20Ω	20Ω	1300Ω	330K	40K	820Ω
V2	6AU6	130Ω	0Ω	20Ω	30Ω	1400Ω	1400Ω	820Ω		
V3	6AU6	190Ω	0Ω	120Ω	0Ω	1480Ω	1480Ω	820Ω		
V4	6AU6	47K	0Ω	120Ω	0Ω	113K	113K	820Ω		
V5	6AL5	560K	560K	0Ω	0Ω	780Ω	0Ω	6300Ω		
V6	6BE6	0Ω	0Ω	0Ω	0Ω	795Ω	780Ω	820Ω		
V7	6BA6	2.2meg	0Ω	0Ω	0Ω	795Ω	780Ω	820Ω	4.9meg	
V8	12AU7A	1meg	0Ω	0Ω	0Ω	0Ω	560K	560K	560K	
V9	12AU7A	1meg	0Ω	0Ω	0Ω	0Ω	560K	560K	560K	
V10	12AU7A	1meg	0Ω	0Ω	0Ω	0Ω	560K	560K	560K	

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT
• MEASURED IN "AM" POSITION.
* MEASURED FROM OUTPUT OF ML.
** MEASURED FROM PIN 2 OF V12.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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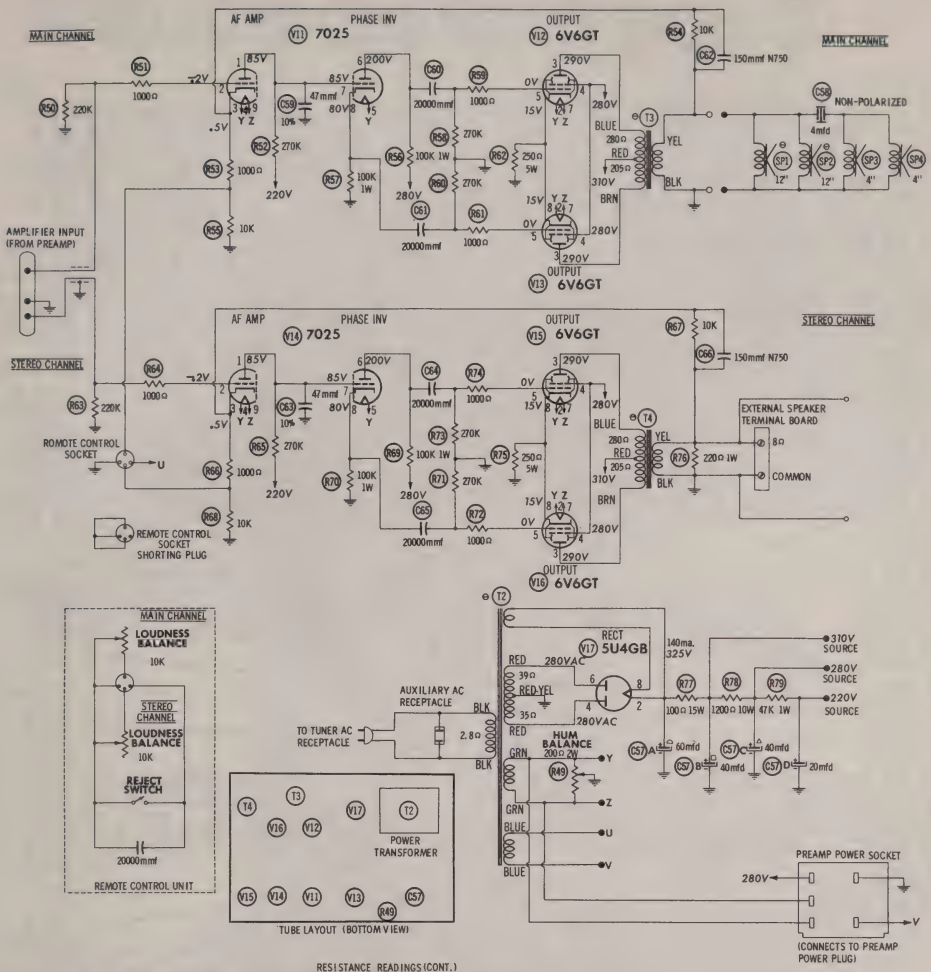
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SILVERTONE MODELS 69A, 70A, 71A
(Ch. 528.53830, 528.59441, 528.59680)

TUNER - PREAMP



RESISTANCE READINGS (CONT.)

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V11	7025	††320K	220K	1000Ω	48Ω	48Ω	††100K	††370K	100K	48Ω
V12	6V6GT	NC	48Ω	††380Ω	††1300Ω	270K	NC	48Ω	250Ω	
V13	6V6GT	NC	48Ω	††305Ω	††1300Ω	270K	NC	48Ω	250Ω	
V14	7025	††320K	220K	1000Ω	48Ω	48Ω	††100K	††320K	100K	48Ω
V15	6V6GT	NC	48Ω	††380Ω	††1300Ω	270K	NC	48Ω	250Ω	
V16	6V6GT	NC	48Ω	††305Ω	††1300Ω	270K	NC	48Ω	250Ω	
V17	5U4GB	NC	¶	NC	35Ω	NC	39Ω	NC	¶	

†† MEASURED FROM PIN 2 OF V17. NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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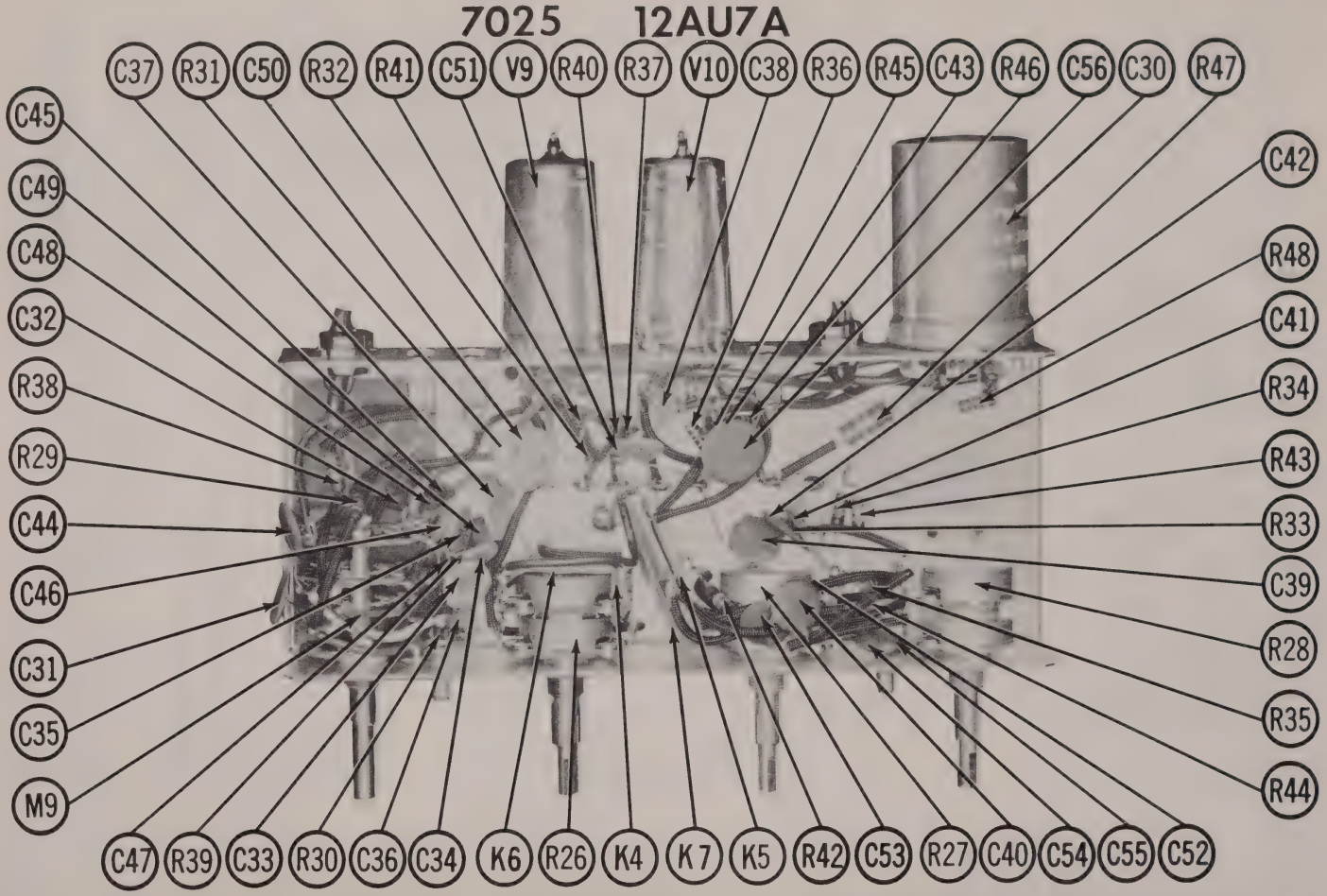
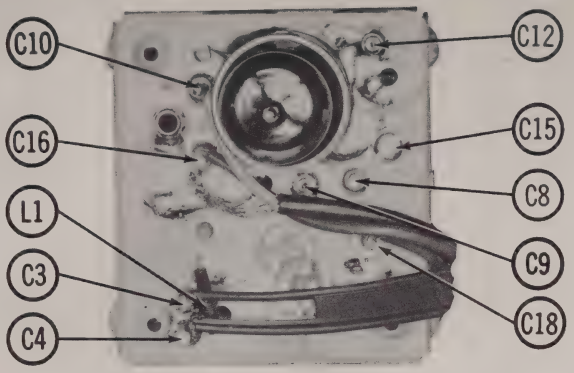
SILVERTONE MODELS 69A, 70A, 71A (Ch. 528.53830, 528.59441, 528.59680)

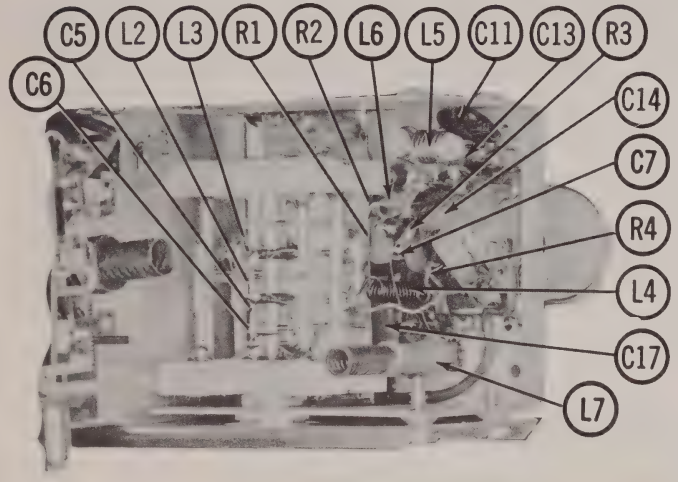
AMPLIFIER



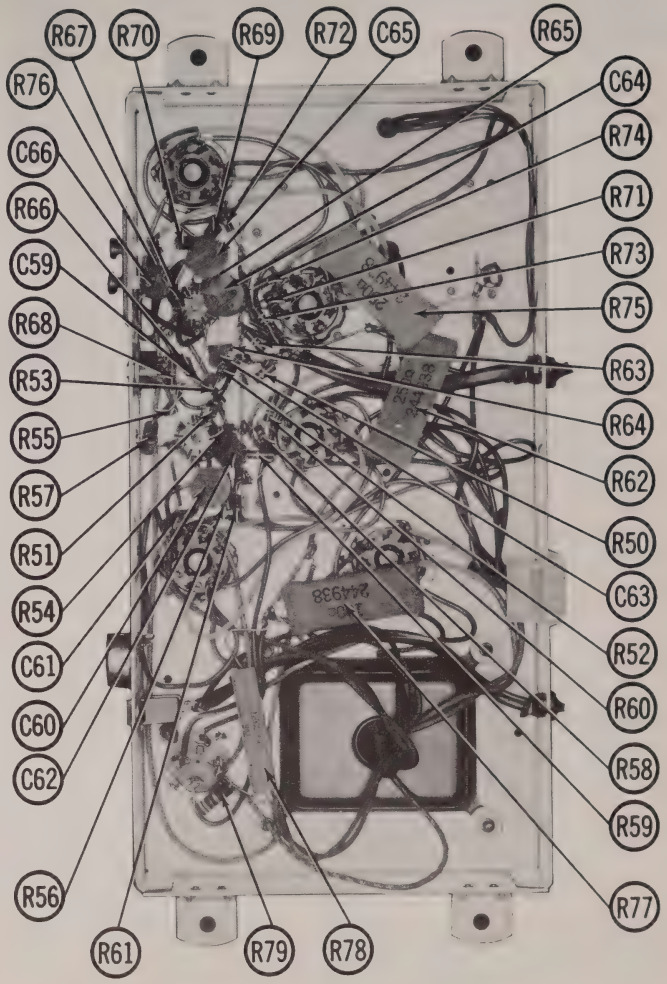
PREAMP CHASSIS



FM RF SUB CHASSIS - TOP VIEW



FM RF SUB CHASSIS - BOTTOM VIEW



AMP. CHASSIS - BOTTOM VIEW

AMP PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V11	Main Channel AF Amp. - Phase Inverter	7025	V15	Stereo Channel Output	6V6GT
V12	Main Channel Output	6V6GT	V16	Stereo Channel Output	6V6GT
V13	Main Channel Output	6V6GT	V17	Rectifier	5U4GB
V14	Stereo Channel AF Amp. - Phase Inverter.	7025			

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C57A	▲80	450	18-55-3		C0365	FP376.6	TMT-193	TVL-3791	
B	■40	450			BR-4035	TC795	TD-40-350	TVA-1611	
C	▲40	350							
D	20	300							
C58	4	150NP	18-9-5	NP-PRS7750	BBR8-150 †	TCN510		TVAS-1402.1*	

† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C59	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C60	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C61	2000Ω		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C62	150 N750		N750-DI 150	DTN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15
C63	47 10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C64	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C65	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C66	150 N750		N750-DI 150	DTN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R49	200Ω	2(WW)	24-1-3				FL200P	Hum Balance

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R50	220K	
R51	1000Ω	
R52	270K	
R53	1000Ω	
R54	10K	
R55	10K	
R56	100K 1W	
R57	100K 1W	
R58	270K	
R59	1000Ω	

ITEM No.	RATING	REMARKS
R60	270K	
R61	1000Ω	
R62	250Ω 5W	#61-161-0
R63	220K	
R64	1000Ω	
R65	270K	
R66	1000Ω	
R67	10K	
R68	10K	
R69	100K 1W	

ITEM No.	RATING	REMARKS
R70	100K 1W	
R71	270K	
R72	1000Ω	
R73	270K	
R74	1000Ω	
R75	250Ω 5W	#61-161-0
R76	220Ω 1W	
R77	100Ω 15W	#61-159-0
R78	1200Ω 10W	#61-160-0
R79	47K 1W	

Silvertone Part Number.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	117V Ⓐ .92A	560 VCT Ⓐ .140A	24V Ⓐ .2A	C80-33-0B①						
	SEC. 3	SEC. 4	SEC. 5							
	5V Ⓐ 3A	6.3V Ⓐ 3.2A								

① Alternate Part #80-33-0.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	6300Ω CT	6-8Ω	C80-116-1A①	22S88	A-2905	AU-606	A-3880	22S88	S-55X	
T4	6300Ω CT	6-8Ω	C80-116-1A①	22S88	A-2905	AU-606	A-3880	22S88	S-55X	

① Alternate Part #80-116-1.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA SILVERTONE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	12"	PM	14-16Ω	33-423-4	12A6AZ16	* Alternate Part Number for SP1 or SP2
SP2	12"	PM	14-16Ω	33-423-4	12A6AZ16	
SP3	4"	PM	12-14Ω	33-417-4	4A07Z13.5	
SP4	4"	PM	12-14Ω	33-417-4	4A07Z13.5	
	12"	PM	6-8Ω	33-419-4 *	12A12Z7.4	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M9	Switch	69-298-0	Selector
M10	Switch	69-282-0	Stereo-Monaural (Part of Changer)
M11	Switch	84-7838	Off-On (Part of Changer)
M12	Solenoid	27-74-2	Reject (Part of Changer)
M13	Motor	59-162	Phono-Drive (Part of Changer 528.56762)
	Motor	59-158	Phono-Drive (Part of Changer 528.56763)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

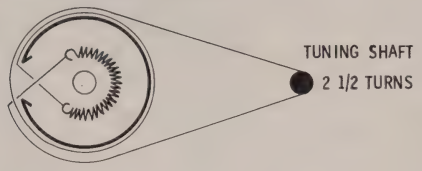
NAME	PART NO.	DESCRIPTION
Knob	52-1109-0	FM Tuning
Knob	52-1144-0	AM Tuning
Knob	52-1267-0	Loudness, Bass, Treble
Knob	52-1273-0	Stereo Balance, Bass, Treble, Radio Selector
Knob	52-1275-0	Selector, Amplifier
Knob	52-1237-0	Off-On Reject (Part of Changer)
Knob	52-1238-0	Speed Control (Part of Changer)
Cabinet	42-128-3	Model 69A
Cabinet	42-129-3	Model 70A
Cabinet	42-130-3	Model 71A
Cabinet Leg	49-502	Model 69A
Cabinet Leg	49-503	Model 70A
Cabinet Leg	49-504	Model 71A
Dial Pointer	52-215-1	
Window	48-171-1	

PHOTOFACT® Folder with CIRCUITRACE®

TOSHIBA
MODEL 6TP-314

DIAL CORD STRINGING

TUNING GANG FULLY CLOSED



TOSHIBA
MODEL 6TP-314

TOSHIBA
MODEL 6TP-314

TRADE NAME	Toshiba Model 6TP-314
IMPORTER	Transistor World Corp., 52 Broadway, New York 4, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	4.5 Volts DC
RATING	4.5MA@4.5 Volts DC (No Signal, Min. Volume) 7MA@4.5 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	530 — 1650KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1, A2, A3... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A6..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to base of Converter. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output.
2.	Loop	1650KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	600KC	Tune to 600KC signal.	"	A5	"
4.	"	1400KC	Tune to 1400KC signal.	"	A6	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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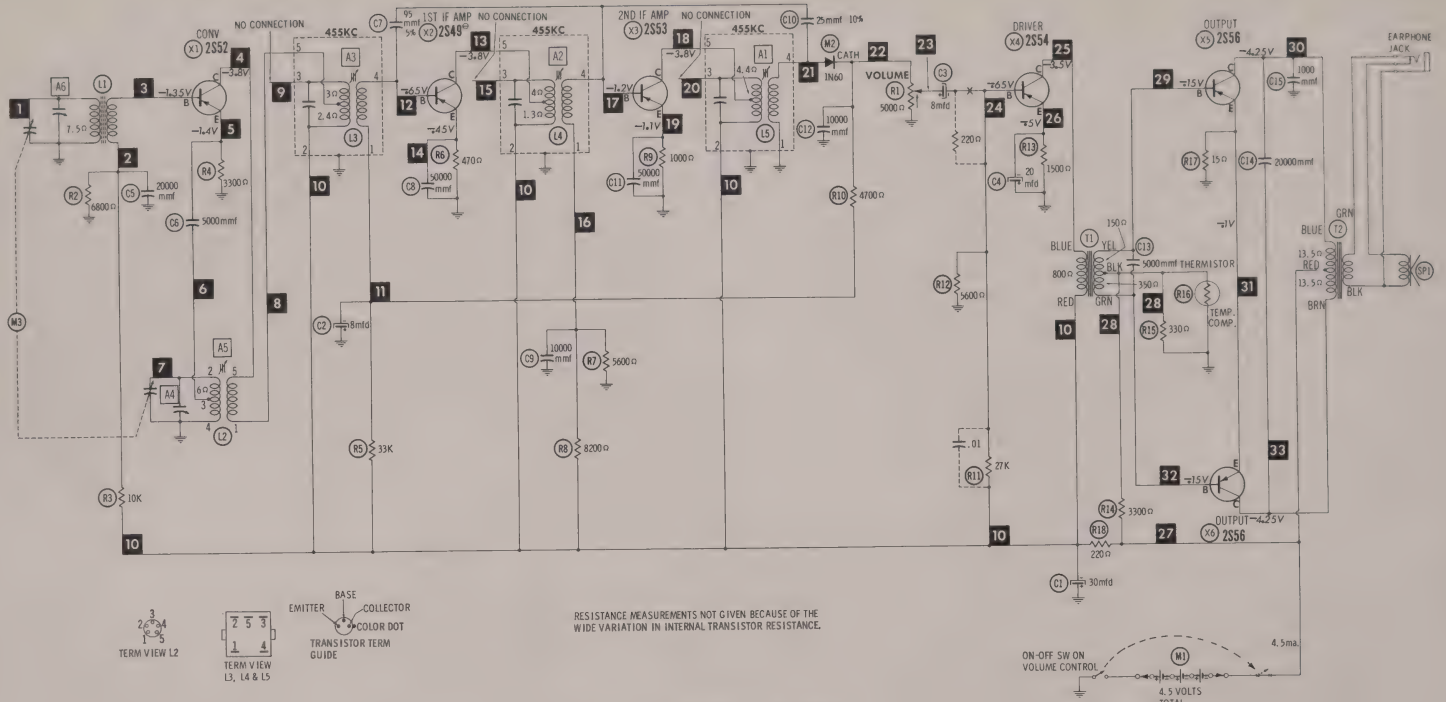
JF724

SET 490 FOLDER 14



RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

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TOSHIBA
MODEL 6TP-314

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S52	Converter		2N412	2N486	2N412	PNP
X2	2S49 *	1st IF Amplifier		2N410	2N483	2N410	PNP
X3	2S53	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	2S54	Driver		2N406	2N362	2N408	PNP
X5	2S56	Output		2N408	2N632	2N408	PNP) Matched
X6	2S56	Output		2N408	2N632	2N408	PNP) Pair

* Alternate Type 2S53 may be used in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TOSHIBA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	6	6M30E		NLW237			TE-1092	
C2	8	3	3M8E		NLW8-6	TT6X8	ML8-6	TE-1052.5	
C3	8	3	3M8E		NLW8-6	TT6X8	ML8-6	TE-1052.5	
C4	20	3	3M20E		NLW20-6		ML25-3	TE-1054	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C6	5000		C80V502AM	DDM-502	H-05D5		TA-250	TG-D50
C7	95 5%		1469-0001	DTZ-100	22R5T1	CM-19B-101J	MCE235	MS-31
C8	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50
C9	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C10	25 10%		1469-000025	DTZ-25	22R5Q25	CM-19B-270K	MCB220	MS-425
C11	50000		C80V503AM	DDA-503	H-05S5		TA-150	TG-S50
C12	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C13	5000		C80V502AM	DDM-502	H-05D5		TA-250	TG-D50
C14	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C15	1000		C80V102AM	DM-102	H-05D1		GP210	5HK-D10

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TOSHIBA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	40266	B16-214				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	6800Ω	
R3	10K	
R4	3300Ω	
R5	33K	
R6	470Ω	
R7	5600Ω	

ITEM No.	RATING	REMARKS
R8	8200Ω	
R9	1000Ω	
R10	4700Ω	
R11	27K	
R12	5600Ω	
R13	1500Ω	

ITEM No.	RATING	REMARKS
R14	3300Ω	
R15	330Ω	
R16	Temp. Comp.	#M-8601
R17	15Ω	
R18	220Ω	

Toshiba Part Number.

PRINTED BOARD

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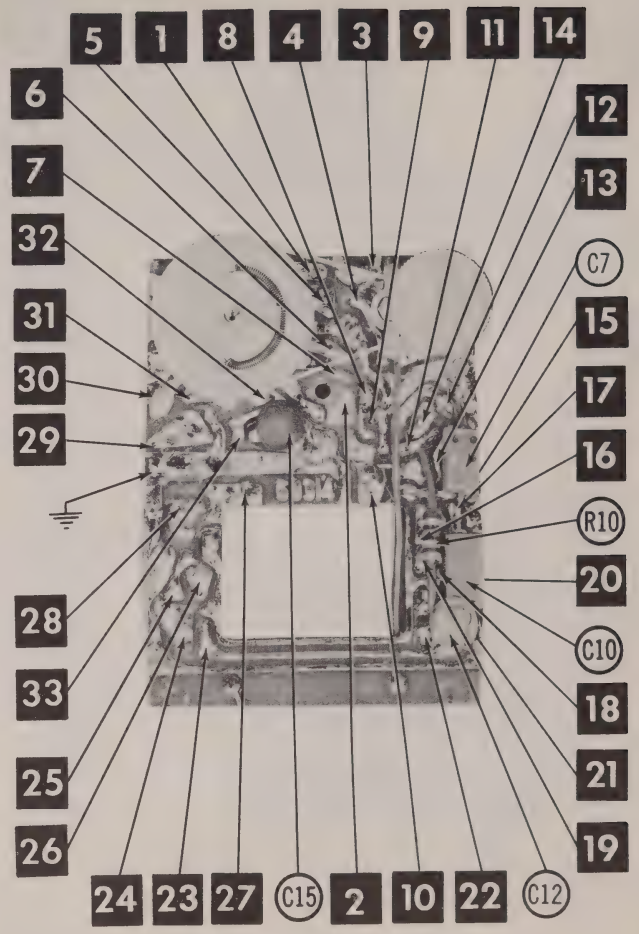


TOSHIBA
MODEL 6TP-314

FOLDER 14

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		TOSHIBA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	LH-202						
L2	Osc. Coil	LH-150						
L3	1st IF Trans.	IT-0735						
L4	2nd IF Trans.	IT-0736						
L5	3rd IF Trans.	IT-0737						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TOSHIBA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	.7	1	DT-0312A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	TOSHIBA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	340Ω	6-8Ω	MT-0473A							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TOSHIBA PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω	SP-230IA	22A06Z8	

BATTERIES

ITEM No.	VOLTAGE	TOSHIBA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V	UM-3 *		1 *		935 *		M-14R *	* 3 Required

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		TOSHIBA PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60		1N60	1N60	1N60	Detector (Pigtail)

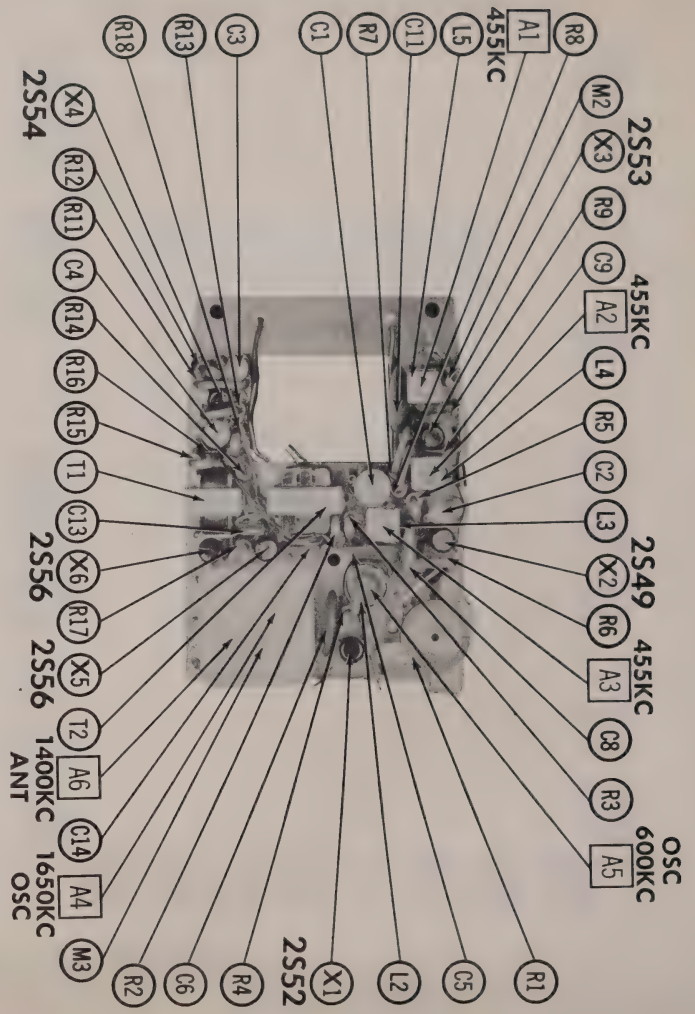
MISCELLANEOUS

ITEM No.	PART NAME	TOSHIBA PART No.	NOTES
M3	Tuning Cap.	VC-2029	2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

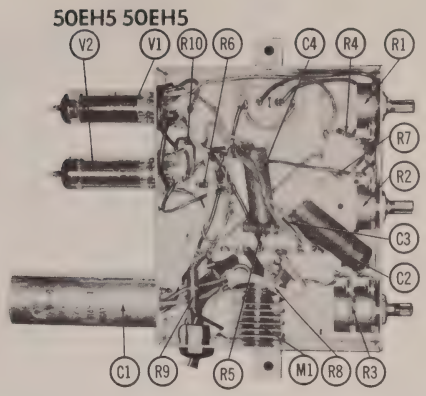
CHASSIS—TOP VIEW



PHOTOFACT® Folder

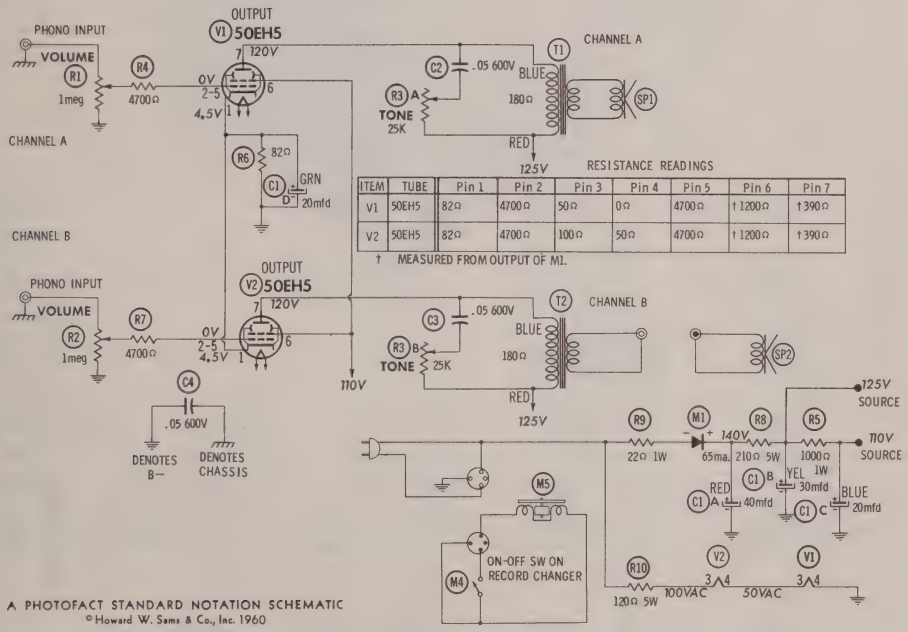
TRUETONE MODEL 4DC5908

TRUETONE
MODEL 4DC5908



TRADE NAME	Truetone Model 4DC5908
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City 8, Mo.
TYPE SET	AC Operated 2 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-125 Volts AC, 60 Cycles RATING 26 Watts, .28 Amp @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #RC-38 - SEE MONARCH UA8 - PHOTOFACT SET 381 FOLDER 11.



ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	50EH5	82Ω	4700Ω	50Ω	0Ω	4700Ω	†1200Ω	†390Ω
V2	50EH5	82Ω	4700Ω	100Ω	50Ω	4700Ω	†1200Ω	†390Ω

RESISTANCE READINGS

† MEASURED FROM OUTPUT OF M1.

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SET 490 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES

♦ CBS ♦ GENERAL ELECTRIC ♦ RAYTHEON ♦ SYLVANIA ♦					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A Output	50EH5	V2	Channel B Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	40	150	EC-121	PR4-200	BBRQ44315C	WQ230	CDB-Q-1001	TVA-3448	
B	30	150						TVA-1410	
C	20	150							
D	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					
				AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.05	600V		P688N-05	DD-503	CUB6S5	6DP-3-503	GEM-615	6TM-S5
C3	.05	600V		P688N-05	DD-503	CUB6S5	6DP-3-503	GEM-615	6TM-S5
C4	.05	600V		P688N-05	DD-503	CUB6S5	6DP-3-503	GEM-615	6TM-S5

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	VC-118	B-70	A47-1meg-Z	QI3-137	U53	Volume, Channel A
B	Shaft			Not Req	KSS-3	Not Req	Not Req	
R2A	1meg	½	VC-118	B-70	A47-1meg-Z	QI3-137	U53	Volume, Channel B
B	Shaft			Not Req	KSS-3	Not Req	Not Req	
R3A	25K	½	VC-196	B-26			FA153L	Tone, Channel B
B	25K			SR-26			RU153L	Tone, Channel A
C	Shaft			Not Req			CS3500	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	4700Ω	
R5	1000Ω 1W	
R6	82Ω	

ITEM No.	RATING	REMARKS
R7	4700Ω	
R8	210Ω 5W	
R9	22Ω 1W	

ITEM No.	RATING	REMARKS
R10	120Ω 5W	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	AT-51	24S53	A-3025	AU-605	A-3332	24S53	S-12X	
T2	2400Ω	3-4Ω	AT-51	24S53	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	SPK-38	4A1	
SP2	4"	PM	3-4Ω	SPK-38	4A1	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	TRUETONE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.065A	SR-4 ♦	T100 ♦	1235AH ♦	100A ♦	SR200 *	♦Selenium Type *Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA									
	TRUETONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M2	PU-46	76TB	N8-3 & N8-7	96					

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS	
	TRUETONE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.		
M3	NE-13 (LP)		CRA-57X † or CRA-57XD ♦	† Jewel	♦ Diamond
	NE-14 (78RPM)		CRA-57 † or CRA-57D ♦		

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Switch		Off-On (Part of Changer)
M5	Motor		Turntable (Part of Changer)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	K301	
Cabinet	CA-341	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1785-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT® Folder

**TRUETONE MODELS
4DC5960, 4DC5962**

TRUETONE MODELS
4DC5960, 4DC5962

MODEL 4DC5960

TRUETONE MODELS
4DC5960, 4DC5962

TRADE NAME	Truetone Models 4DC5960, 4DC5962
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City 8, Mo.
TYPE SET	AC Operated 3 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-125 Volts AC, 60 Cycles RATING 30 Watts, .32 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M 1201 - PHOTOFACT SET 436 FOLDER 18

SET 490 FOLDER 16

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Left Channel AF Amp. - Right Channel AF Amp.	12AX7	V2 V3	Left Channel Output Right Channel Output	50EH5 50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	FB5925	PRS3800	BBRT84215	TCT3119	TDLT-7	TVA-3455	
B	40	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C3	3500	(5000) †	BPD-0033	DD-332	BYA10D33	CCD-332	GP233	5HK-D33
C4	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C5	10000		BPD-01	DD-103	BYA10S1	CCD-152	GP110	5HK-S10
C6	3500	(5000) †	BPD-0033	DD-332	BYA10D33	CCD-332	GP233	5HK-D33
C7	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C9	.25 400V		P488N-25		CUB4P25	4DP-5-254	GEM-4025	4TM-P25
C10	.1 400V	(.047) †	P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

† Alternate Value

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	5meg		DCV-5					Loudness, Right Channel
B	5meg							Loudness, Left Channel
R2A	2meg		DT-189					Tone, Left Channel
B	2meg							Tone, Right Channel
R3	1meg		B-188					Balance

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

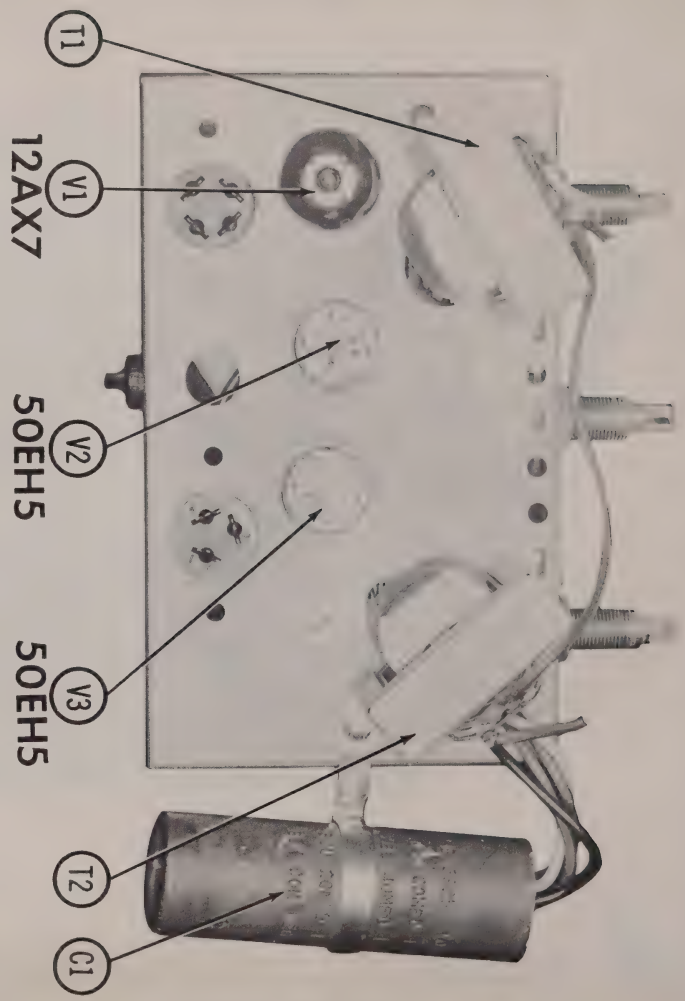
ITEM No.	RATING	REMARKS
R4	6.8meg	
R5	220K	
R6	470Ω	(560Ω) *
R7	10K	
R8	47Ω	(68Ω) *

ITEM No.	RATING	REMARKS
R9	6.8meg	
R10	220K	
R11	470Ω	(560Ω) *
R12	10K	
R13	47Ω	(68Ω) *

ITEM No.	RATING	REMARKS
R14	150Ω 1W	
R15	2200Ω 1W	
R16	33Ω 1W	
R17	33Ω 1W	

* Alternate Value.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3500Ω	6-8Ω	T-187							
		SEC. 2 55Ω								
	PRI	SEC. 1								
T2	3500Ω	6-8Ω	T-187							
		SEC. 2 55Ω								

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	8"	PM	6-8Ω		8A31Z8	
SP2	8"	PM	6-8Ω		8A31Z8	

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA TRUETONE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.070A	*	2E4 *	HA154 *	K200 *	SR200 *	* Silicon Type

PHONO CARTRIDGE

ITEM No.	TRUETONE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M2	3DX5381	13T	Not Req.	13	Not Req.			10T2-S	Not Req.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA TRUETONE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M3		* W-204DS †♦ or * W-204DD-1♦	* A-44X † or * A-44XSD †♦ or * A-44XDD♦	† Jewel ♦ Diamond * Includes Cartridge

CABINETS & CABINET PARTS

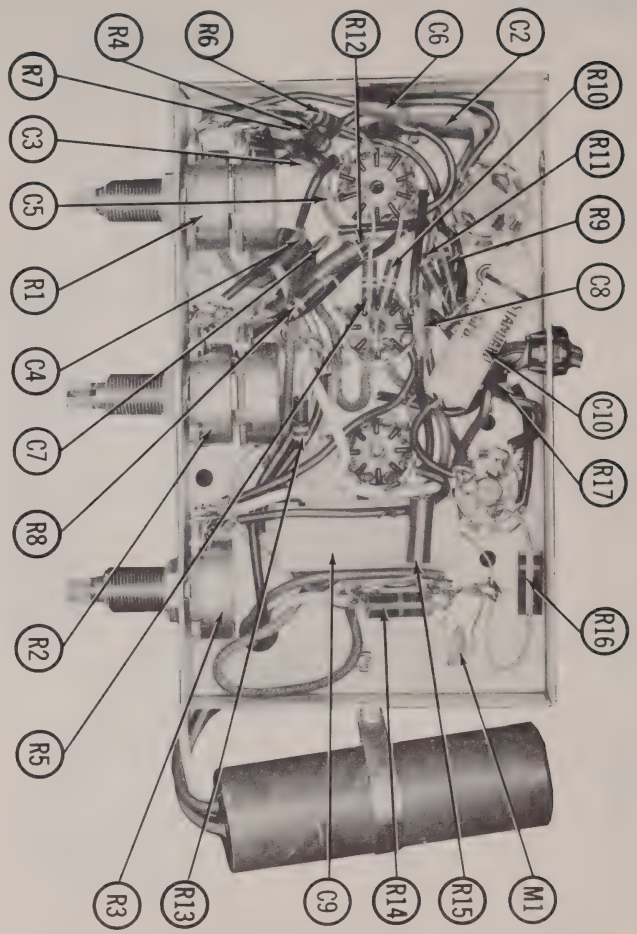
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	R5925	Loudness, Balance, Tone
Cabinet	5925	Mahongany
Cabinet	5926	Blonde

WIRING DATA

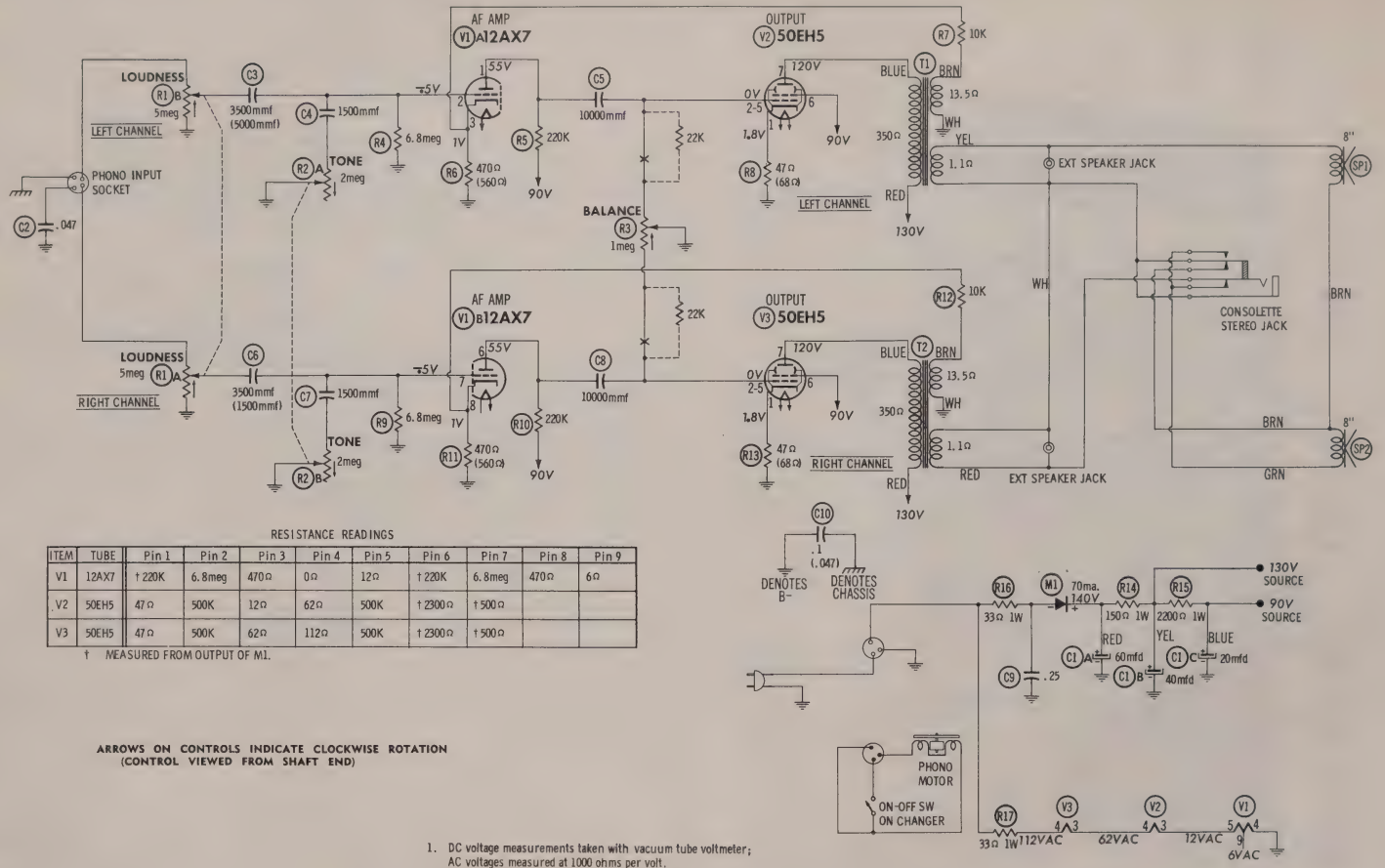
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW



TRUETONE MODELS
4DC5960, 4DC5962

FOLDER 16



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†220K	6.8meg	470Ω	0Ω	12Ω	†220K	6.8meg	470Ω	6Ω
V2	50EH5	47Ω	500K	12Ω	62Ω	500K	†2300Ω	†500Ω		
V3	50EH5	47Ω	500K	62Ω	112Ω	500K	†2300Ω	†500Ω		

† MEASURED FROM OUTPUT OF M1.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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TRUETONE MODELS 4DC5960, 4DC5962

PHOTOFACT® Folder

WESTINGHOUSE MODELS H-57ACS1, H-57ACS2 (Ch. V-2507-3)

WESTINGHOUSE MODELS
H-57ACS1, H-57ACS2 (Ch. V-2507-3)

MODEL H-57ACS1

WESTINGHOUSE MODELS
H-57ACS1, H-57ACS2 (Ch. V-2507-3)

TRADE NAME	Westinghouse Models H-57ACS1, H-57ACS2 (Ch. V-2507-3)
MANUFACTURER	Westinghouse Electric Corp., Radio-TV Div., Metuchen, N. J.
TYPE SET	AC Operated 5 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	105 - 120 Volts AC, 60 Cycles RATING 53 Watts, .53 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #670V010H33 — SEE V-M 1201 — PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET490 FOLDER 17

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

TUBES

CBS		GENERAL ELECTRIC		RAYTHEON		SYLVANIA	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE		
V1	Left Channel AF Amp. - Right Channel AF Amp.	7025 (12AX7) *	V3	Left Channel Output	6BQ5		
V2	Left Channel AF Amp. - Right Channel AF Amp.	7025 (12AX7) *	V4	Right Channel Output	6BQ5		
			V5	Rectifier	EZ81/6CA4		

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▰40	350	218V037H06	AFH4-18-40	D0176	FP428.4	TMQ-119	TVL-4774	
B	■40	350							
C	▲30	350							
D	30	350							
C2	10	25	218V025H33	PRS1250	BBR10-25	TC22	TD-10-25	TVA-1204	
C3	50	25	218V025H32	PRS1265	BBR50-25	TC29	TD-50-25	TVA-1206	
C4	4	50NP	218V025H19	NP-PRS7405	BBR8-150 †	TCN504		TVANS-1302.5*	
C5	4	50NP	218V025H19	NP-PRS7405	BBR8-150 †	TCN504		TVANS-1302.5*	

† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

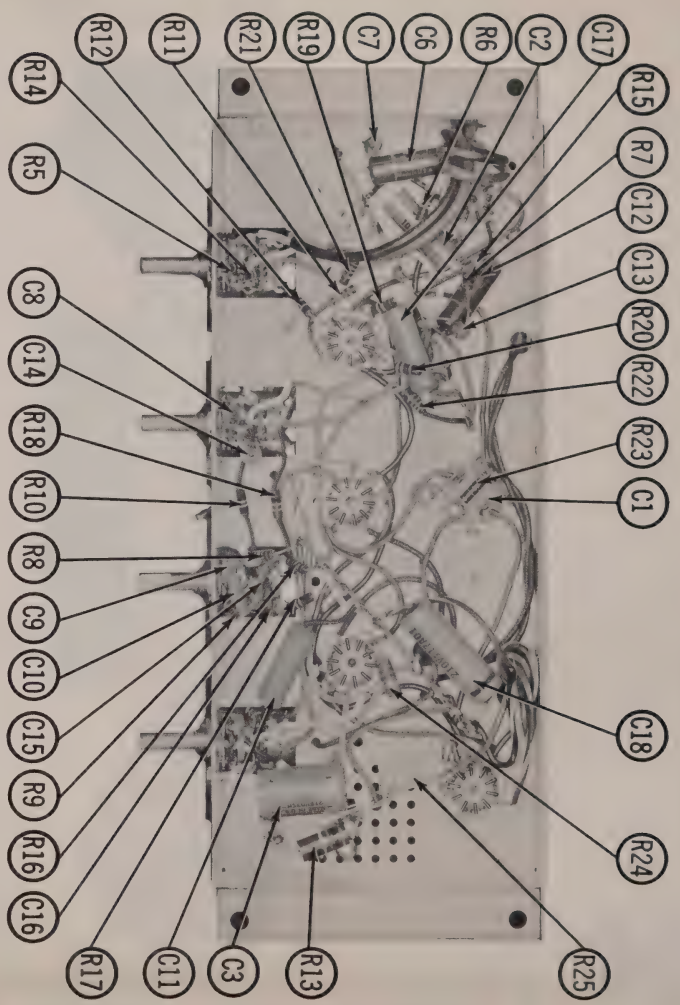
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1
C7	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C8	2200		BPD-0022	DD-222	BYA10D22	CCD-222	GP222	5HK-D22
C9	2200		BPD-0022	DD-222	BYA10D22	CCD-222	GP222	5HK-D22
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C11	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1
C12	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1
C13	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C14	2200		BPD-0022	DD-222	BYA10D22	CCD-222	GP222	5HK-D22
C15	2200		BPD-0022	DD-222	BYA10D22	CCD-222	GP222	5HK-D22
C16	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C17	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1
C18	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	2meg		270V088H04	B-76	AD47-2meg-Z		FA26A	Loudness, Left Channel
B	2meg			SR-76	Not Req.		RU26A	Loudness, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	
R2A	1meg		270V088H05	B-69	AD47-1meg-S		FBI6L	Treble, Left Channel
B	1meg			SR-69	Not Req.		RUI6L	Treble, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	
R3A	1meg		270V088H05	B-69	AD47-1meg-S		FBI6L	Bass, Left Channel
B	1meg			SR-69	Not Req.		RUI6L	Bass, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	
R4A	500K		270V088H06					Balance, Left Channel
B	500K						UE4120-S	Balance, Right Channel
C	Switch							Stereo-Monaural

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	820K	
R6	220K	
R7	1000Ω	
R8	150K	
R9	22K	
R10	100K	
R11	150K	

ITEM No.	RATING	REMARKS
R12	6800Ω	
R13	100Ω 2W	
R14	820K	
R15	220K	
R16	150K	
R17	22K	
R18	100K	

ITEM No.	RATING	REMARKS
R19	150K	
R20	6800Ω	
R21	33K	
R22	33K	
R23	12K	
R24	2200Ω 1W	
R25	230Ω 4W	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V Ⓐ .53A	500VCT Ⓐ .070A	6.3V Ⓐ 3A	410V015H01						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9000Ω CT	6-8Ω CT	430V091H01							
T3	6700Ω	6-8Ω	430V092H02	24S09				24S09		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	6"	PM	6-8Ω	570V068H03	6A3IZ6.1	
SP2	4"	PM	6-8Ω	570V071H01	4A1Z6.1	
SP3	6"	PM	6-8Ω	570V068H03	6A3IZ6.1	
SP4	4"	PM	6-8Ω	570V071H01	4A1Z6.1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA								
	Westinghouse PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M1	671V009H01	13TB	Not Req.	26D9	Not Req.			8TA-4-SD	N-8TA-SD

PHONO NEEDLE

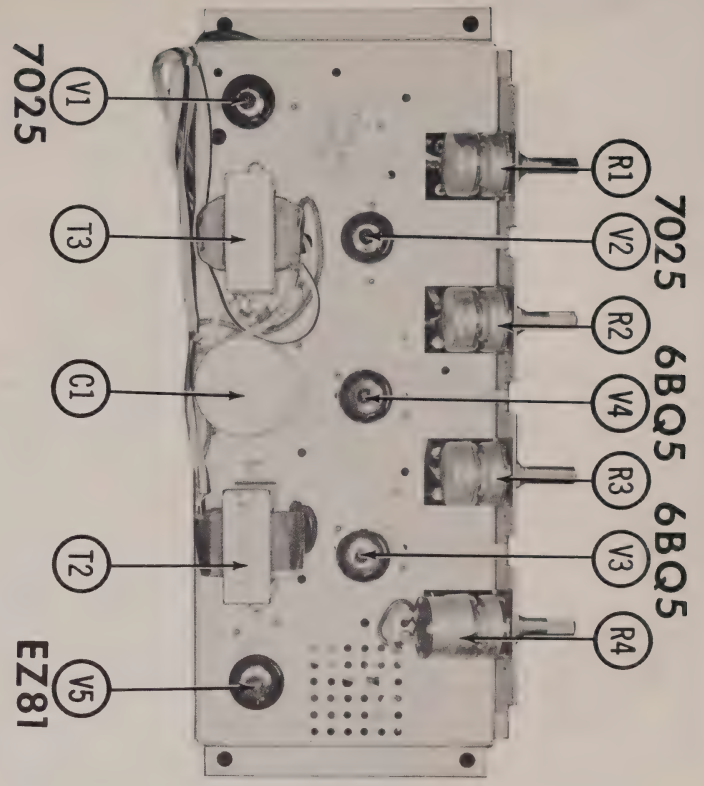
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	Westinghouse PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M2	690V023H05 ♦	W-103STSS † or W-103STDS ♦†	S-69X † or S-69XSD ♦† or S-69XDD ♦	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M3	Motor		Phono Drive (Part of Changer)
M4	Switch		Off-On (Part of Changer)

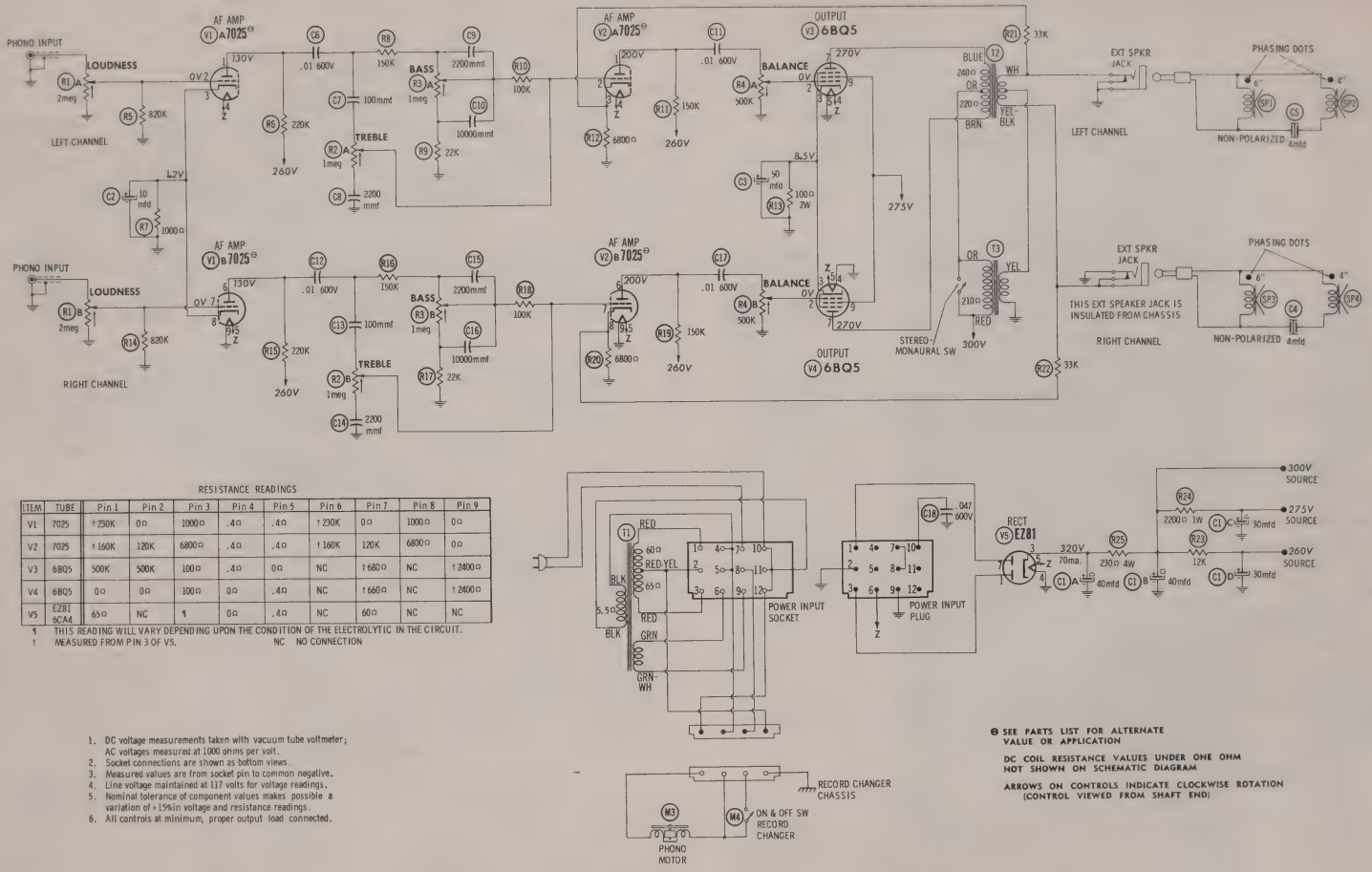
CHASSIS—TOP VIEW



CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V118H01	All Controls
Cabinet	690V024H00	Center Section, Model H-57ACS1
Cabinet	690V024H03	Center Section, Model H-57ACS2
Cabinet	690V024H02	Speaker Enclosure (Left), Model H-57ACS1
Cabinet	690V024H01	Speaker Enclosure (Right), Model H-57ACS1
Cabinet	690V024H05	Speaker Enclosure (Left), Model H-57ACS2
Cabinet	690V024H04	Speaker Enclosure (Right), Model H-57ACS2



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†230K	0Ω	1000Ω	.4Ω	.4Ω	†230K	0Ω	1000Ω	0Ω
V2	7025	†160K	120K	6800Ω	.4Ω	.4Ω	†160K	120K	6800Ω	0Ω
V3	6BQ5	500K	500K	100Ω	.4Ω	0Ω	NC	†680Ω	NC	†2400Ω
V4	6BQ5	0Ω	0Ω	100Ω	0Ω	.4Ω	NC	†660Ω	NC	†2400Ω
V5	EZ81 6CA4	65Ω	NC	¶	0Ω	.4Ω	NC	60Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V5. NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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WESTINGHOUSE MODELS
H-57ACS1, H-57ACS2 (Ch. V-2507-3)

PHOTOFACT® Folder with CIRCUITRACE®

WESTINGHOUSE MODELS H-715T5, H-716T5 (Ch. V-2400-1)

WESTINGHOUSE MODELS H-715T5, H-716T5 (Ch. V-2400-1)

MODEL H-715T5

TRADE NAME	Westinghouse Models H-715T5, H-716T5 (Ch. V-2400-1)
MANUFACTURER	Westinghouse Electric Corp., Metuchen, N. J.
TYPE SET	AC Operated 5 Tube FM Receiver
POWER SUPPLY	105 – 120 Volts AC, 60 Cycles
TUNING RANGE—BROADCAST	88 – 108MC RATING 28 Watts, .3 Amp. @117 Volts AC

WESTINGHOUSE MODELS H-715T5, H-716T5 (Ch. V-2400-1)

SET 490 FOLDER 18

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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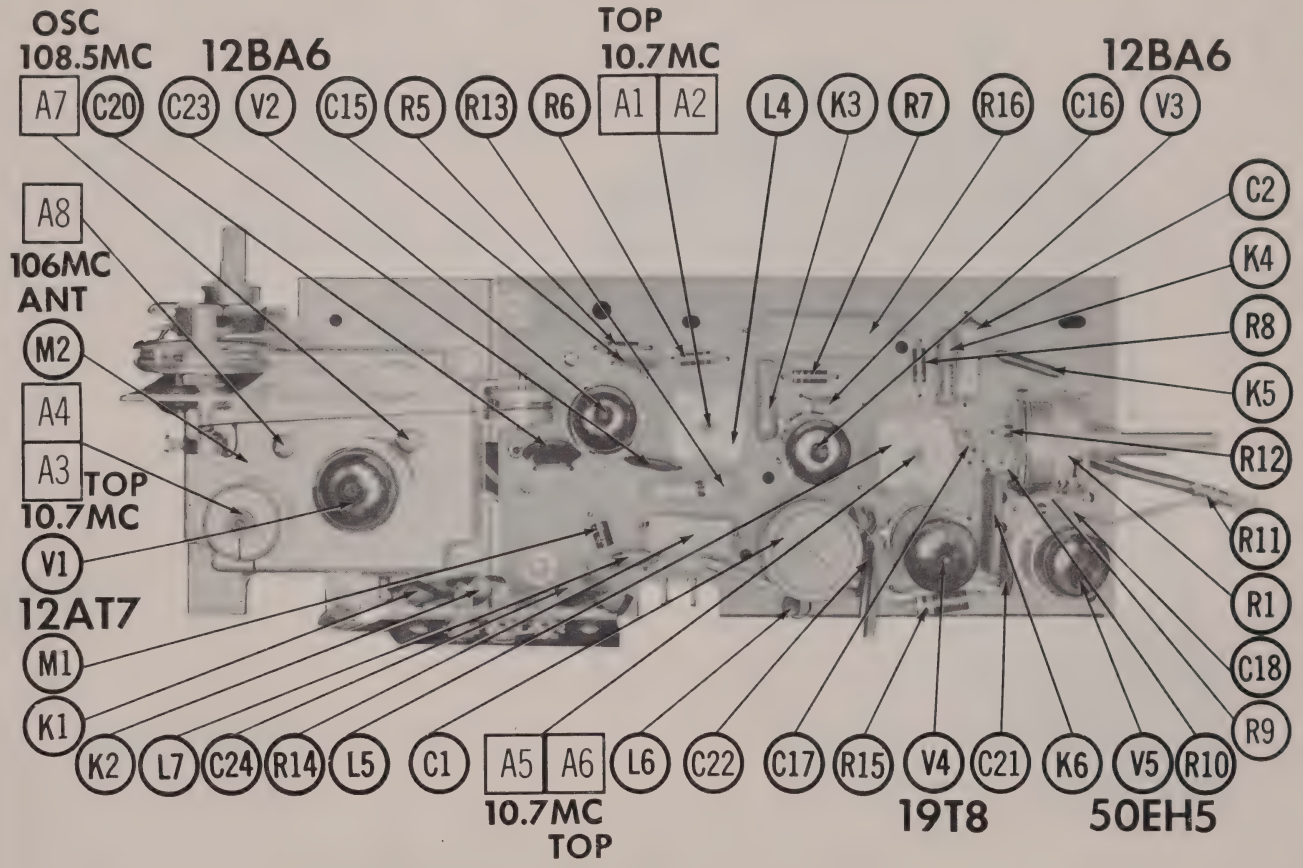


CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.
Use only enough generator output to provide a usable indication on VTVM.
Suggested alignment tools:
A1, A2, A5, A6..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A3, A4..... GENERAL CEMENT #8282, 8606, 8606-L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544
A7, A8..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	Across external antenna terminals.	10.7MC (Unmod.)	High end stop.	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	High side thru .001mfd to pin 1 (grid) of 2nd IF Amp. Low side to chassis.	"	"	"	A5	"
3.	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

IF ALIGNMENT USING FM SIGNAL GENERATOR & OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	Across external antenna terminals.	10.7MC (450KC Swp.)	High end stop.	Vert. amp. to point Ⓐ. Low side to chassis.	A1, A2, A3, A4	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 2.
2.	High side thru .001mfd to pin 1 (grid) of 2nd IF Amp. Low side to chassis.	"	"	"	A5	"
3.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A6	Reconnect C2. Adjust to place marker at the center of crossover lines similar to Fig. 3. SLIGHTLY retouch A5 for maximum amplitude and straightness of crossover lines.

RF ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	Across external antenna terminals thru matching network (Fig. 1).	108.5MC (Unmod.)	High end stop.	DC probe to point Ⓐ. Common to chassis.	A7	Adjust for maximum deflection.
5.	"	106MC	Tune to 106MC signal.	"	A8	Adjust for maximum deflection while rocking tuning.

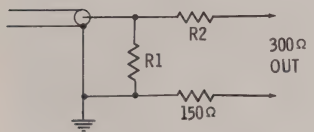


FIG. 1

Zo=IMPEDANCE OF SWEEP CABLE

Zo	R1	R2
52Ω	56Ω	120Ω
72Ω	85Ω	110Ω

FIG. 2

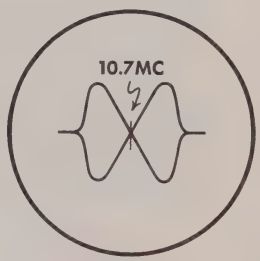
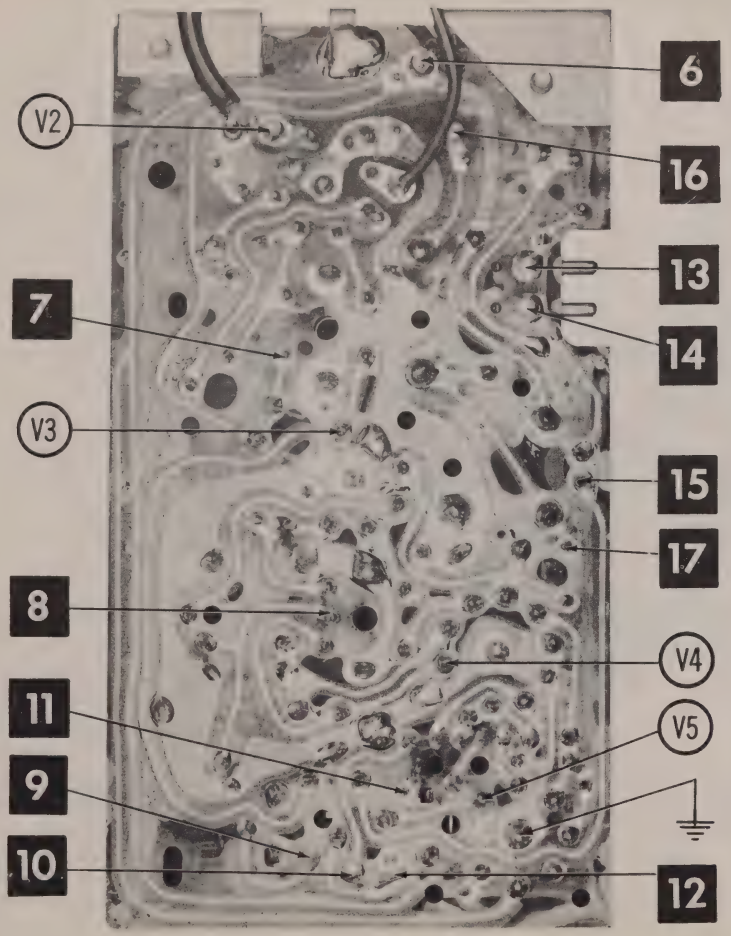


FIG. 3



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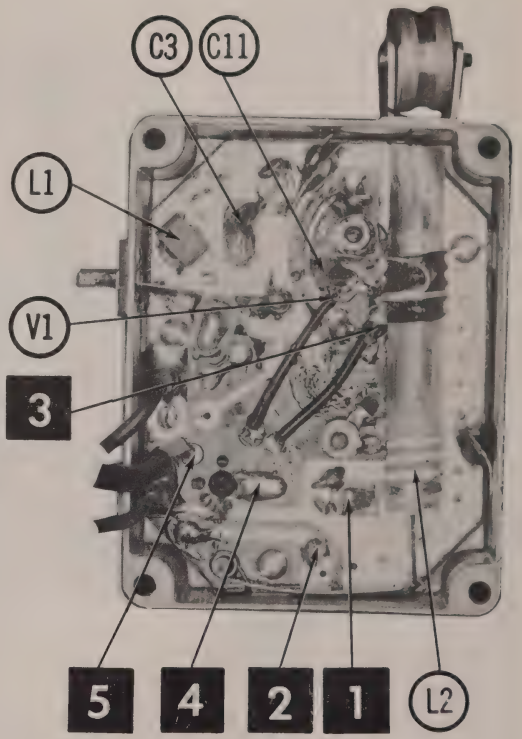
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

TUNER PRINTED BOARD



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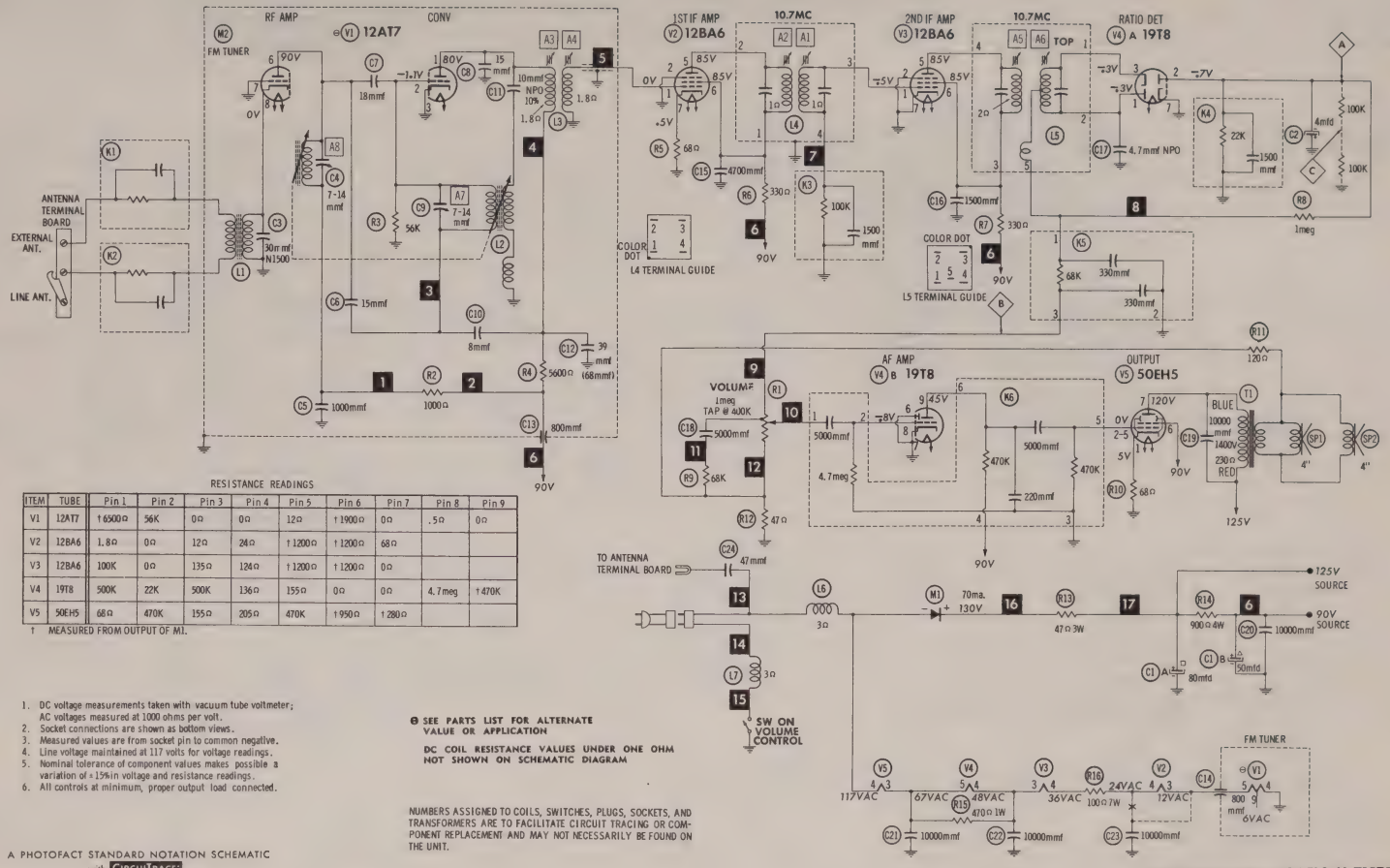
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

FM RF PRINTED BOARD



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AT7	†6500Ω	56K	0Ω	0Ω	12Ω	†1900Ω	0Ω	.5Ω	0Ω
V2	12BA6	1.8Ω	0Ω	12Ω	24Ω	†1200Ω	†1200Ω	68Ω		
V3	12BA6	100K	0Ω	135Ω	124Ω	†1200Ω	†1200Ω	0Ω		
V4	19T8	500K	22K	500K	136Ω	155Ω	0Ω	0Ω	4.7meg	†470K
V5	50EH5	68Ω	470K	155Ω	205Ω	470K	†950Ω	†280Ω		

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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WESTINGHOUSE MODELS H-715T5, H-716T5 (Ch. V-2400-1)

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amp. -Converter	12AT7 Note 1	V4	Ratio Detector- AF Amplifier	19T8
V2	1st IF Amplifier	12BA6			
V3	2nd IF Amplifier	12BA6	V5	Output	50EH5

Note 1. Some versions may use 12DT8 in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	1000Ω	
R3	56K	
R4	5600Ω	
R5	68Ω	
R6	330Ω	

ITEM No.	RATING	REMARKS
R7	330Ω	
R8	1meg	
R9	68K	
R10	68Ω	
R11	120Ω	

ITEM No.	RATING	REMARKS
R12	47Ω	
R13	47Ω 3W	#251V023H23
R14	900Ω 4W	#251V020H23
R15	470Ω 1W	
R16	100Ω 7W	#251V020H24

Westinghouse Part Number.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	150	218V037H05	PRS2240	BBRD8515	TCD498	TDLD-12	TVA-2462	
B	▲50	150							
C2	4	50	218V012H13	PWE50005	EC5-50	TT50X4	ML4-50	TE-1302.1	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA
K1	Antenna Filter		219V032A03	
K2	Antenna Filter		219V032A03	
K3	2nd IF Amp. Grid Filter	1500mmf, 100K	219V004H07	
K4	Ratio Detector Network	1500mmf, 22K	219V004H08	
K5	De-emphasis	(2) 330mmf, 68K	219V034H01	
K6	Audio Coupling	220mmf, (2) 5000mmf, (2) 470K, 4.7meg	219V033H01	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	30 N1500	#215V013A30				*		
C4	7-14	#690V013H72						
C5	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C6	15		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C7	18		NPO-DI 20	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18
C8	15		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C9	7-14	#690V013H72						
C10	8		NPO-DI 8.2		C10V8C			10TCC-V82
C11	10 NPO 10%		NPO-DI -10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C12	39	(68mmf) †	NPO-DI 39	TCZ-39	C10Q39C	CCTO-390	CNO-439	10TCC-Q39
C13	800		EF-001	MFT-1000		CCF-102	CT280A	
C14	800		EF-001	MFT-1000		CCF-102	CT280A	
C15	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C16	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C17	4.7 NPO		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C18	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C19	10000 1400V		DAC-27	DD16-103	HVE16S1	16DP-3-103	UAC-110	BL-S10
C20	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C24	47		1468-000047	TCZ-47	22R5Q47	CM-20B-470M	MC225	1FM-447

Westinghouse Part Number.
† Alternate Value.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Westinghouse PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Trans.	690V013H76						
L2A	RF Coil	690V013H73						
B	Osc. Coil							
L3	1st IF Trans.	690V013H75						
L4	2nd IF Trans.	235V058H01	16-3490	16-3490		1463-PC		
L5	Ratio Detector	235V056H01	17-3491	17-3491		1465-PC		
L6	Line Choke	230V028H07	19-1003	19-1003	BC-564	4608		3.9uh
L7	Line Choke	230V028H07	19-1003	19-1003	BC-564	4608		3.9uh

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2700Ω	3-4Ω	430V065H01①	24S53	A-3025	AU-605	A-3332	24S53	S-12X	① Includes speaker

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1meg 400K Tap	1/2	270V027H16					Volume & Switch

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Westinghouse PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	570V026H03	4A1	
SP2	4"	PM	3-4Ω	570V026H03	4A1	

PARTS LIST AND DESCRIPTIONS (Continued)

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	Westinghouse PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.070A	295V017H01 *	SD500 *	HA154 *	F-2 *	SR200 *	* Silicon Type

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M2	FM Tuner Assy.	476V001H03	Complete (Less Tube)

CABINETS & CABINET PARTS

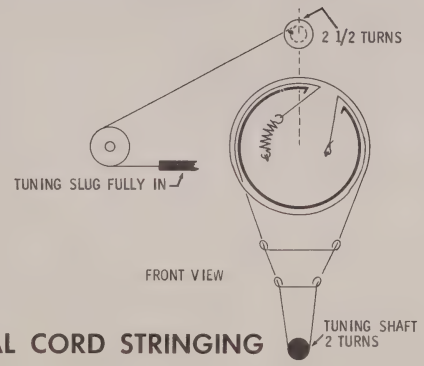
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V101H06	Tuning
Knob	550V091H02	Volume
Cabinet	513V043H08	Model H-715T5
Cabinet	513V043H09	Model H-716T5
Cabinet Front	558V236H02	

WIRING DATA

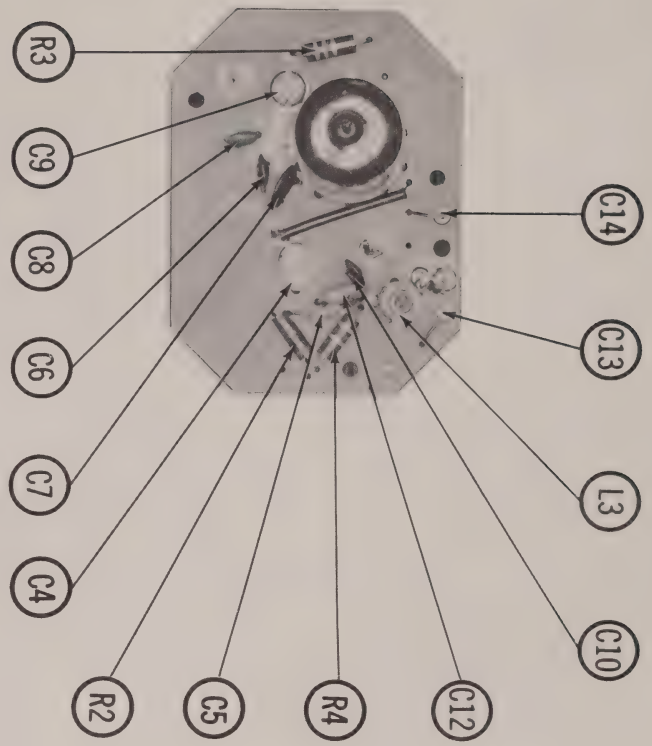
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

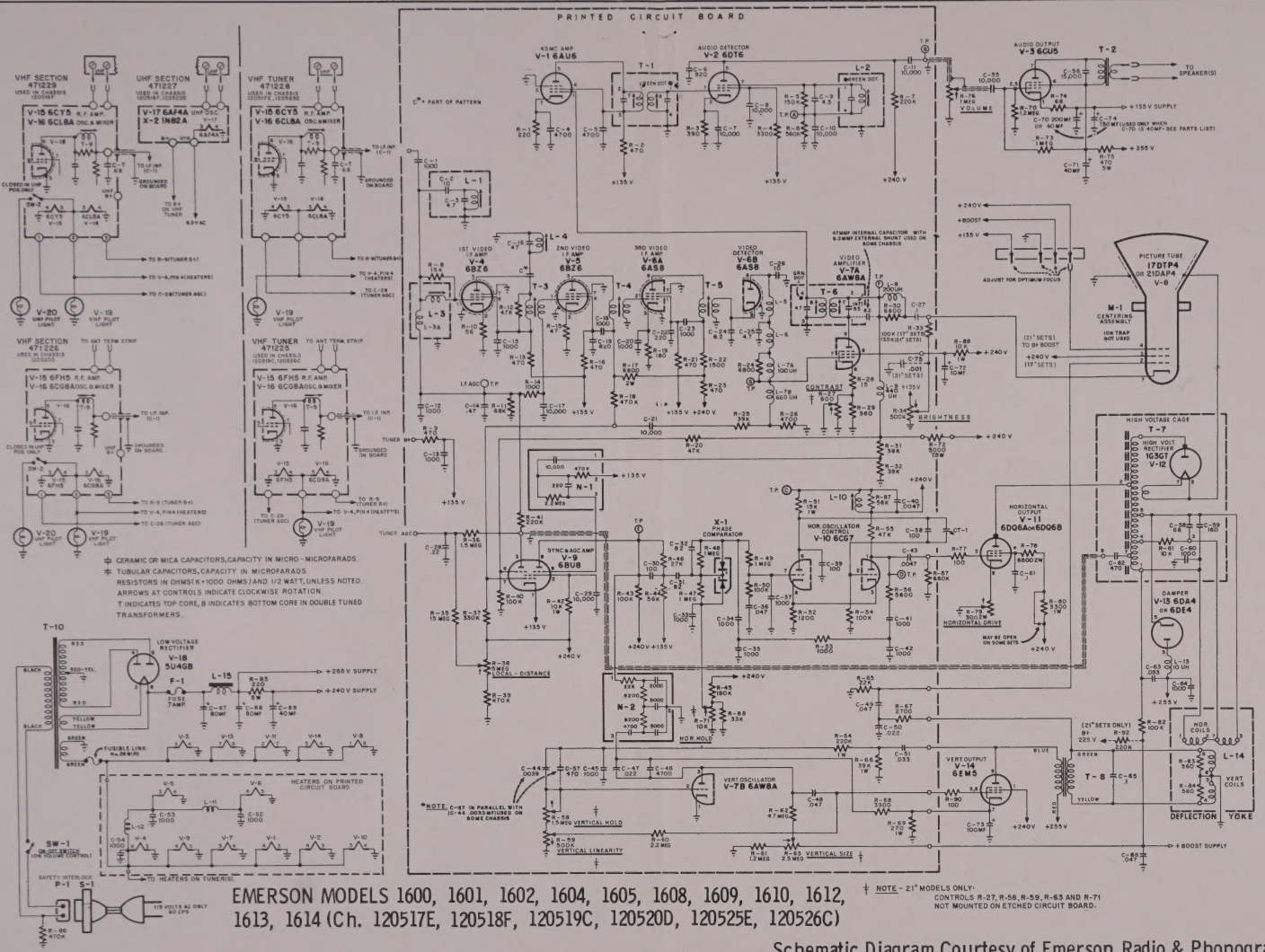
Power Cord (Interlock Type) ..... Use BELDEN No. 8874



DIAL CORD STRINGING

FM RF SUBCHASSIS





* PART OF PATTERN

‡ CERAMIC OR MICA CAPACITORS, CAPACITY IN MICRO-MICROFARADS.

‡ TUBULAR CAPACITORS, CAPACITY IN MICROFARADS.
RESISTORS IN OHMS (K=1000 OHMS) AND 1/2 WATT, UNLESS NOTED.
ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION.
T INDICATES TOP CORE, B INDICATES BOTTOM CORE IN DOUBLE TUNED TRANSFORMERS.

*NOTE: C-57 IN PARALLEL WITH C-44 .0033 MFD USED ON SOME CHASSIS

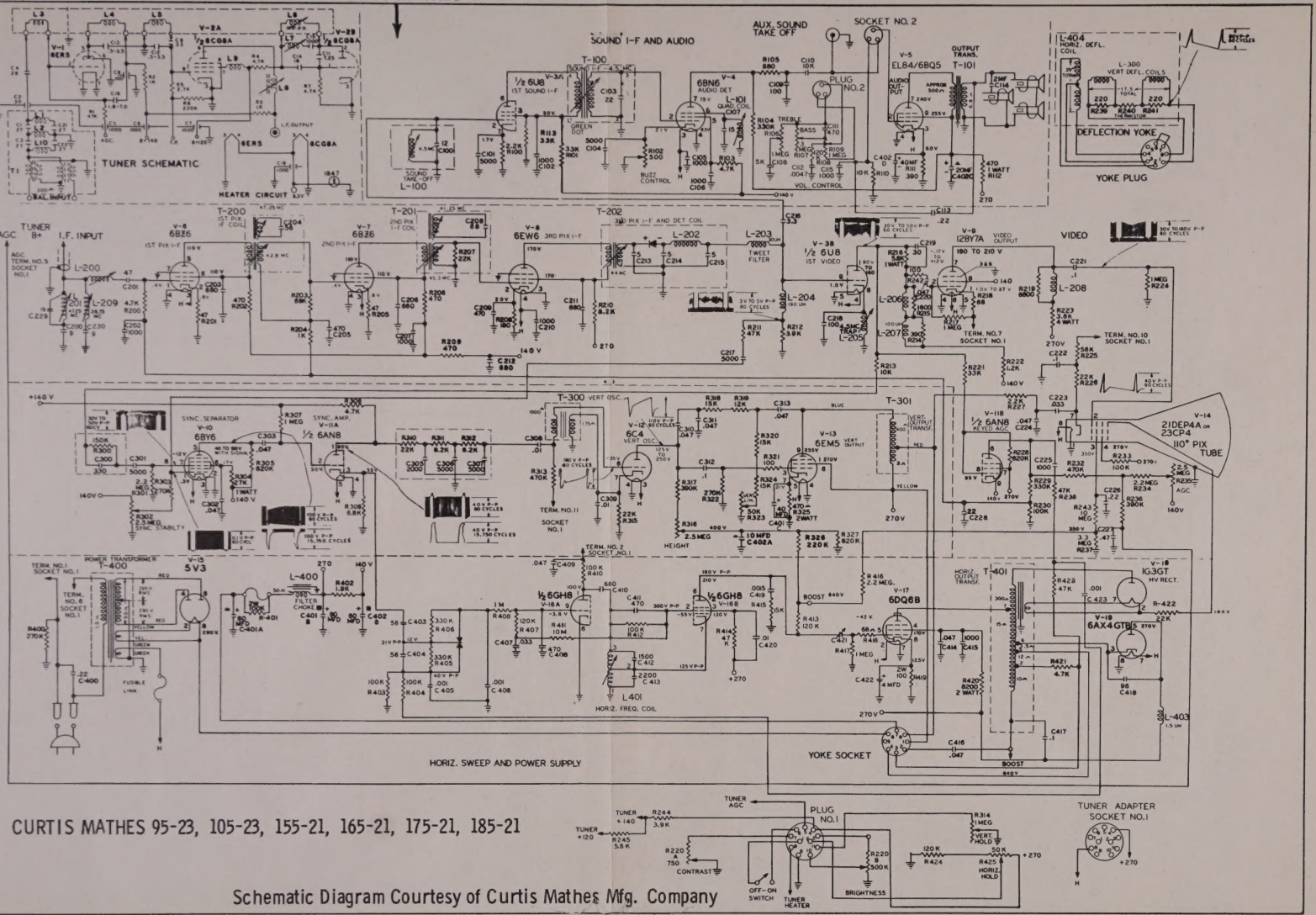
‡ NOTE - 21" MODELS ONLY:
CONTROLS R-27, R-58, R-59, R-63 AND R-71 NOT MOUNTED ON ETCHED CIRCUIT BOARD.

EMERSON MODELS 1600, 1601, 1602, 1604, 1605, 1608, 1609, 1610, 1612, 1613, 1614 (Ch. 120517E, 120518F, 120519C, 120520D, 120525E, 120526C)

Schematic Diagram Courtesy of Emerson Radio & Phonograph Corp.

← EMERSON

CURTIS MATHES



CURTIS MATHES 95-23, 105-23, 155-21, 165-21, 175-21, 185-21

Schematic Diagram Courtesy of Curtis Mathes Mfg. Company

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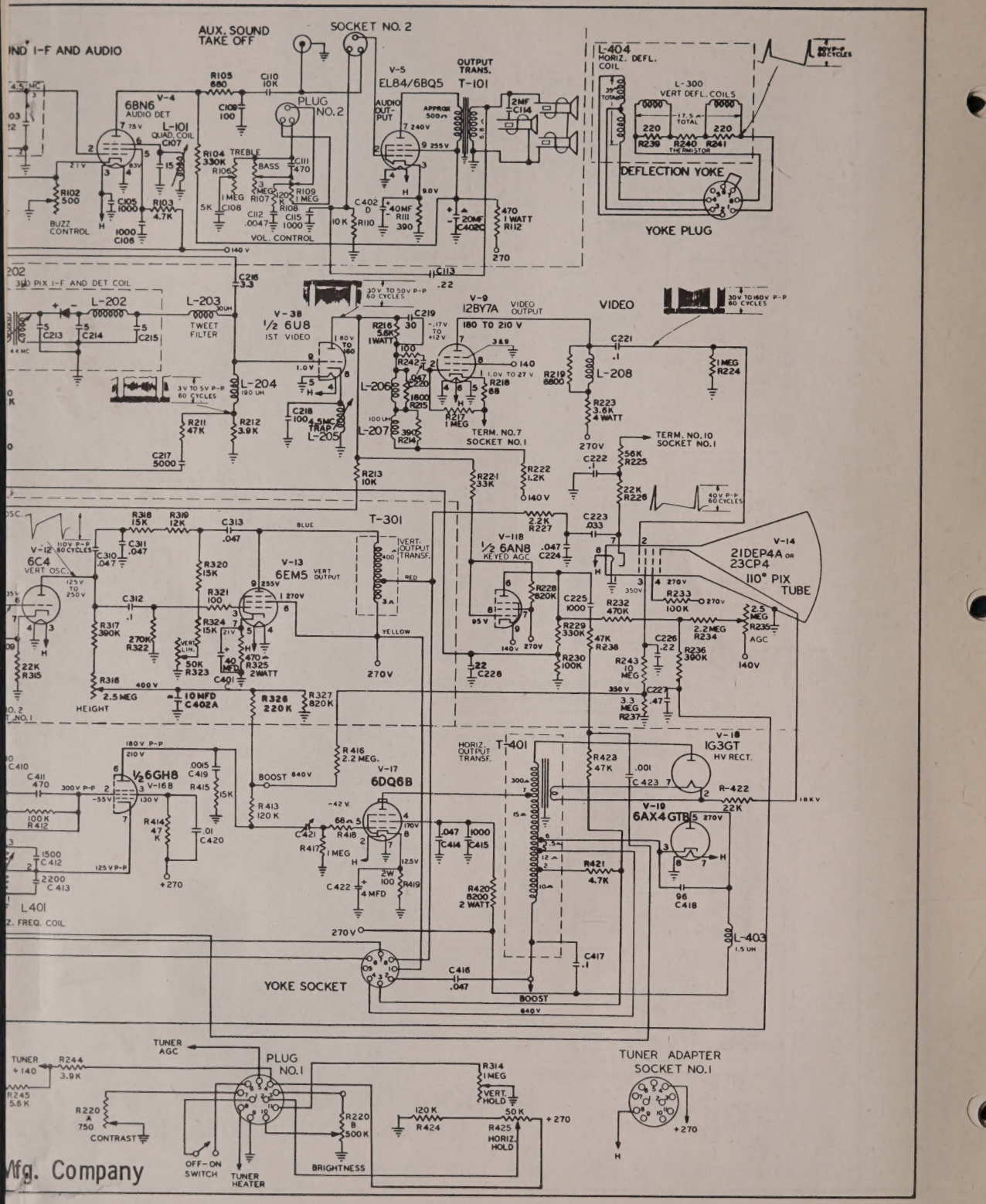
SET 490 FOLDER 19-S


IND I-F AND AUDIO
AUX. SOUND TAKE OFF
SOCKET NO. 2
PLUG NO. 2
V-4 6BN6 AUDIO DET
L-101 QUAD. COIL
V-5 EL84/6BQ5 AUDIO OUTPUT
OUTPUT TRANS. T-101
L-404 HORIZ. DEFL. COIL
L-300 VERT DEFL. COILS
DEFLECTION YOKE
YOKE PLUG
BUZZ CONTROL
VOL. CONTROL
TREBLE
BASS
V-3B 1/2 6U8 1ST VIDEO
V-9 12BY7A VIDEO OUTPUT
VIDEO
L-202
L-203 TWEET FILTER
L-204
L-205
L-206
L-207
L-208
TERM. NO. 7 SOCKET NO. 1
TERM. NO. 10 SOCKET NO. 1
V-12 6C4 VERT OSC.
V-13 6EM5 VERT. OUTPUT
T-301 VERT. OUTPUT TRANSF.
V-11B 1/2 6AN8 KEYED AGC
V-14 21DEP4A OR 23CP4 110° PIX TUBE
HEIGHT
VERT. LIN.
AGC
V-16B 1/2 6GH8
V-17 6DQ6B
T-401 HORIZ. OUTPUT TRANSF.
V-18 1G3GT HV RECT.
V-19 6AX4GTB
L-401 FREQ. COIL
L-403
YOKE SOCKET
BOOST
TUNER AGC
PLUG NO. 1
TUNER ADAPTER SOCKET NO. 1
CONTRAST
OFF-ON SWITCH
TUNER HEATER
BRIGHTNESS
HORIZ. HOLD
VERT. HOLD
Mfg. Company